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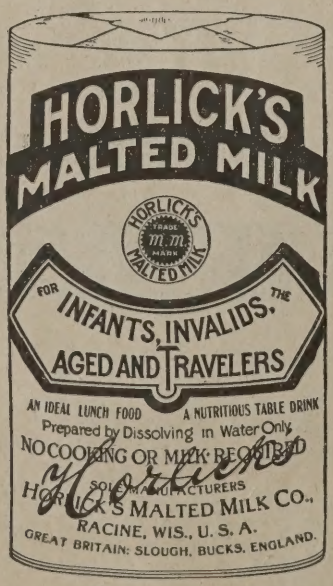

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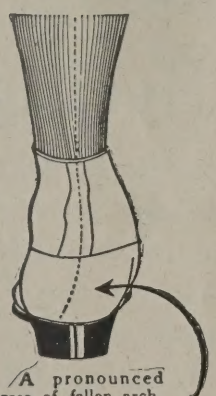

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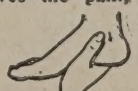

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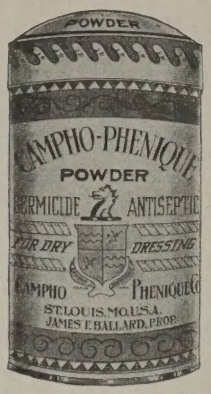

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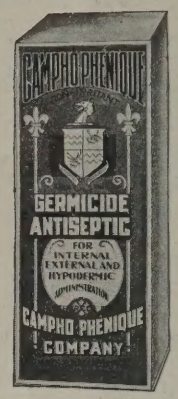

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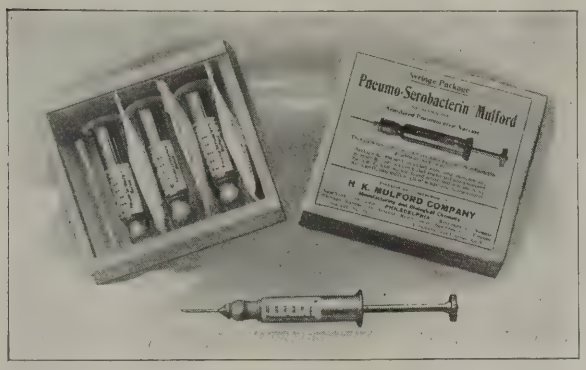

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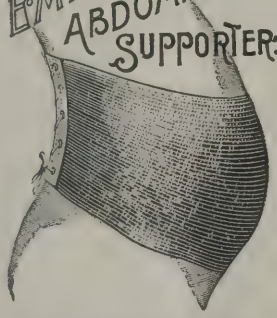

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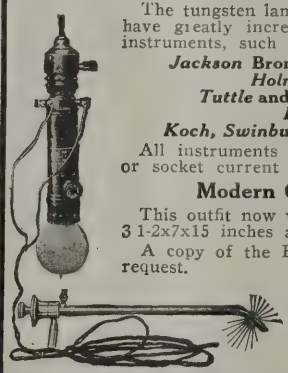

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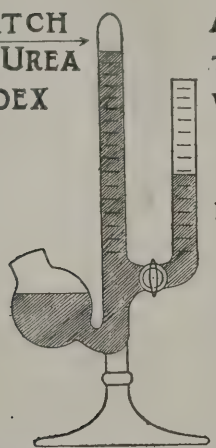

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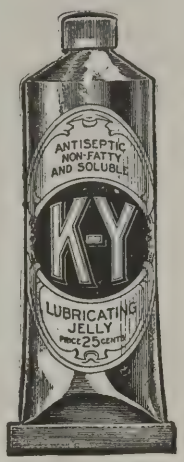

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Alcohol in Its Relation to the Human Body

THE RELATION OF ALCOHOL AND ALCOHOLIC BEVERAGES TO NUTRITION.

WINFIELD SCOTT HALL, PH.D., M. D., F.A.A.M.

PROFESSOR OF PHYSIOLOGY, NORTHWESTERN UNIVERSITY MEDICAL SCHOOL; LECTURER ON DIETETICS AT MERCY HOSPITAL AND AT WESLEY HOSPITAL,

Chicago.

I. The Relation of Alcohol to Life.

Ethyl alcohol is one of the normal products of the life activity of the yeast plant. The yeast plant is a fungus. The method of reproduction used by this order of plants when all conditions are favorable to vegetative growth, is germination or budding. According to the plan of nature only those organisms which possess chlrophyll are able to build up complex food substances from simple inorganic compounds. Thus we find the green-leafed cereal grasses building up cellulose, starch, sugar, oil, and proteins from such inert compounds as CO_2, H_2O, and the mineral salts of the soil.

Organisms not possessing chlorophyll are unable to utilize the inert inorganic materials of their environment. They are dependent upon the chlorophyll-bearing plants for their food. Animals live upon the cellulose starch, sugar, oil and protein elaborated by green plants for their own use. Fungi subsist in a similar though perhaps somewhat humbler way; the toadstool and mushroom appropriating the decaying vegetable matter of field and forest; the yeast plant consuming the sugar of decaying fruits; while moulds and bacteria are found wherever vegetable or animal matter is in the process of degenerative change; in fact it is the presence of these non-chlorophyll bearing organisms which leads to decay.

From the above we see that the fungus possesses many points in common with animals. Its life energies are liberated from the highly organized foods which it first consumes, then decomposes. The food of the yeast plant must contain nitrogenous matter, otherwise there will be a wasting away of the cell substance as shown by Pasteur. (Cited by Schurtzenberger in "Fermentation." New York, 1893).

Besides the nitrogenous food there must be carbonaceous food which is represented by sugar. Then there must be water and salts. As these foods are soluble they may be directly absorbed by the yeast cells without the intervention of any digestive process.

The food thus absorbed by the yeast plant is in part built up into the substance of the yeast plant. A portion of the sugar may thus be utilized to furnish carbonaceous material for the structure of the yeast plant, however, most of the sugar is oxidized into carbon-dioxide gas and alcohol.

Every living organism absorbs certain foodstuffs, assimilates these, and either directly or indirectly oxidizes them, thus breaking them down to simpler substances. Among the substances which leave the yeast plant are, carbon dioxide gas (CO_2), water, (H_2O), glycerin $C_3H_5(OH)_3$, ethyl alcohol (C_2H_5OH) and a nitrogenous waste product.

But the matter which passes out of living cells may be divided into two groups: (1) Matter which is elaborated with the cells and passes in to the surrounding medium where it performs a function or serves a purpose advantageous to the organism. (2) Matter which has been more or less completely broken down and being useless to the cell, is cast out in order that its accumulation within the cell may not clog the vital processes or otherwise injure the cell.

As examples of the first group one thinks at once of the enzymes of the digestive glands elaborated from substances within the cell-plasm, passed out into the lumen of the alimentary canal, where they induce in the contents of the canal chemical changes which are highly advantageous to the organism as a whole. Then there is mucin, formed and passed out of the mucous secreting glands to lubricate and protect the delicate surface of the alimentary, and respiratory tracts and other mucous membranes. Also, oil prepared in the sebaceous glands and thrown out upon the skin to keep it soft and non-absorbent.

As an example of the second group one may name carbondioxide, a product of the oxidation of the carbon of the cell protoplasm. In the case of higher animals urea and uric acid, products of the oxidation of the nitrogenous matter,—are good examples of the second group. The line of division between these two classes of substances is a very clearly marked one.

The second group as enumerated above comes clearly under the classification, *excretions*. While the sub-

stances belonging to the first group come clearly under the classification, *secretions*. The medical dictionaries define excretion as waste matter thrown out of an organism. The term excretion is used in this sense by physiologists generally.

In the light of the use and definition of the word excretion in the literature of nutrition, we can formulate the following definition which would be acceptable to any physiologist: An excretion is any substance; (1) which is the product of intra-cellular oxidation; (2) from which the organism has extracted the maximum energy possible for it; (3) which would injure the cells that formed it if retained in them; and (4) which is expelled by the cells soon after its formation.

All the substances (except water) mentioned above as leaving the body of the yeast plant fulfill these conditions and must therefore be classified as excretions. In no case could they or any one of them be looked upon as a secretion in a sense in which that term is generally used. No one has ever contended that the yeast plant makes any use of these substances after they are thrown out of its body. The fact is the yeast plant throws them out because it can get no further energy out of them. They are thus typical excretions.

The living organism throws out excretions for two reasons: (1) It can make no further use of them and (2) if retained the substance poisons the organism. A clinical fact long known and frequently illustrated is that retained urea and uric acid cause profound disturbance of the nervous system followed by convulsions and death. It is a biological principle universally recognized that the decomposition products of any organism are injurious to that organism. Dr. Vaughan of Ann Arbor (*Ptomaines, Leucomaines, Toxines and Anti-toxines*. 1896, p. 549) expresses this law in the following words: *"The cells of the body, as well as bacteria, are injured when the product of their own activity (their excretions) accumulate about them."*

We must now inquire whether or not alcohol is one of the constituents of the yeast plant excretion which is injurious to that organism. A recent authority on fermentation, Carl Oppenheimer, (*Die Fermente und ihre Wirkungen* Leipsig 1900, p. 276), says: "The question as to how far the cleavage products affect the ferment injuriously can be answered very easily in the case of alcoholic fermentation, since in this case one of the cleavage products, namely, alcohol is in a certain degree of concentration a protoplasm poison which injures the yeast and decreases the fermentation. When the alcohol has reached a strength of 12 per cent. the growth of most species of yeast plants is much decreased, while with 14 per cent. all activity stops."

Not only will the excretion of any living organism poison the organism which produces it, but it will have a toxic action upon any organism of a higher rank, thus the excretion of a mammal might serve as food for some of the lower vertebrates and certainly for fungi and bacteria, while the excretion of the yeast fungus (alcohol) serves as pabulum for the bacterium of acetic acid fermentation. The excretion of the bacteria ptomaines are however, poisonous, not only to the bacteria which form them but to the yeast fungus which is an organism of higher rank. In a similar way alcohol is toxic to the yeast plant which forms it and to all animals and to chlorophyll-bearing plants. The relation of alcohol to life may thus be summed up: (1) Ethyl alcohol is the excretion of a fungus; (2) excretions which are toxic to the organism which excretes them are also toxic to all higher organisms; (3) alcohol is toxic to the yeast plant; and in conformity to the laboratory observations, as well as to the logic of the case alcohol is toxic to all animal protoplasm.

II. The Alcohol-a-Food Theory in the Light of Recent Researches.

All life activity is accompanied by oxidation and all oxidation by waste. Any sparing action which alcohol may possess is easily accounted for as being in harmony with its generally accepted narcotic action.

Narcotic action is followed by decreased activity, therefore decreased oxidation, therefore "sparing." Nobody has contended, much less proven, that this so-called sparing action is an economy of food material in connection with activity. With the influence of alcohol as without it, a given amount of life activity is accompanied by a given consumption of body substance. Morphine is oxidized in the body, it produces a strong narcotic effect with marked decreased activity, and decreased general oxidation. Incident to this decreased general oxidation there is a sparing of food materials. No one would for a moment contend that this sparing of food material under the influence of morphine would justify one in the contention that morphine is a food or has any food value. In a similar way it is inane and foolish to contend that the sparing action of alcohol due to its narcotic effect, should be accepted as an argument proving the food value of alcohol.

A. The Body Oxidizes Alcohol as a Safety Measure.

When one eats a real food it is assimilated largely by muscle tissues and is oxidized for the purpose of liberating the life energy. When one injects alcohol it is carried by the blood to the tissues, mostly to the liver, where it is oxidized as any toxine would be for the purpose of making it harmless.

Its oxidization liberates heat energy but this energy cannot be utilized by the body, even for the maintenance of body temperature. If a FOOD is defined as *a substance which, taken into the body, is assimilated and used either to build up or repair body structure, or to be oxidized in the tissues to liberate the energies used by the tissues in their normal activity;* then alcohol is not a food.

The fact that alcohol is oxidized in the body has been generally misunderstood. The first impression naturally was: Foods are oxidized; alcohol is oxidized; therefore alcohol is a food. As logically might one reason: Man is an animal; the lobster is an animal; therefore, man is a lobster. The fallacy must be apparent. Not all things that are oxidized are foods. Many poisons which from time to time get access to the body are readily oxidized in the body, but nobody has contended that these poisons because of their oxidation should be looked upon as foods, with the one exception of the protoplasmic poison, alcohol.

When a food is oxidized there is liberated the energy of muscular action, of gland action, or of nerve action. There is also liberated heat which maintains the body temperature, but the oxidation of alcohol disturbs muscular, glandular and nervous activity, and the heat which is liberated incident to its oxidation does not maintain body temperature.

If alcohol is not a real food what is the significance of its oxidation? It has long been known that the liver produces oxidaces and that it is the site of active oxidation of mid products of catabolism of toxines, and of other toxic substances. Alcohol while usually formed as an excretion of the yeast plant, as described above, is also found as a mid product of tissue catabolism. It belongs clearly then to the group described above as excreta.

On *a priori* grounds we should expect alcohol to be

oxidized in the liver along with leucin tyrosin, uric acid, xanthin bodies and various other products of tissue oxidation. There have recently appeared two most important papers based upon extended researches upon man and lower animals. These researches practically clear up this knotty question.

Dr. Reid Hunt, in one of the Government Laboratory Stations, undertook an extensive series of experiments to determine the influence of alcohol upon the defense of the system against bacteria and other toxines. Throughout his exhaustive research Dr. Hunt found uniformly that the ingestion of even small doses of alcohol was followed by a marked decrease of the defense of the system against toxines. This effect was due to the disturbance of the liver function.

The other research referred to was conducted by Dr. Beebe and published in the *American Journal of Physiology*. The subject of the experiment was a young man in good health and of regular habits, unaccustomed to the use of alcohol in any form. The diet was uniform throughout. Experiment 1 covered a 16-day period, divided into a 7-day control with all conditions normal, a six-day period during which alcohol was given and a four-day period during which observations were continued without alcohol.

The amount of uric acid excreted was accurately determined. The daily average of uric acid for the control period was 0.653 grams for the alcoholic period, 0.755 grams, and for the post-alcoholic period 0.615 grams. Note that during the alcoholic period the increase of uric acid was approximately 19%,—a notable increase. Subsequent experiments yielded similar results.

The author's conclusions are so important that I will give them in full:

"1. After these experiments there is no doubt that alcohol even in very moderate amounts causes an increase in the excretion of uric acid.

"2. The following points indicate that the effect is due to a toxic influence on the liver, thereby interfering with the oxidation of the uric acid derived from its precursors in the food. Alcohol taken without food causes no increase. Alcohol is rapidly absorbed and passes at once to the liver, the organ which has most to do with the metabolism of protein cleavage products.

"3. The increased excretion means that a large quantity of urates has been produced and not that more of that which is already present has been excreted.

"4. If we accept the origin of the increased quantity of uric acid to be the impaired oxidated powers of the liver, the results of these experiments will have greater significance than can be attributed to the uric acid alone.

"5. The liver performs a large number of oxidations and syntheses designed to keep toxic substances from reaching the body tissues, and if alcohol in the moderate quantities which cause the uric acid excretions impairs its power in this respect, the prevalent ideas regarding the harmlessness of moderate drinking need revision (Beebe)."

The value of this work and that of Reid Hunt can hardly be over estimated. In the first place, the rapid oxidation of the alcohol in the liver is explained. Alcohol itself being one of the toxic substances which reach the liver from the alimentary canal is at once attacked by the liver and if the oncoming tide of alcohol is not too great it will practically all be oxidized.

B. Bodily Defense Cannot Resist Too Heavy Assaults.—But the hepatic oxidation of toxic substances other than alcohol, is impaired in the meantime so that they get past the liver to the tissues where they do injury. Some of these toxines are excreted unoxidized by the kidneys, as shown above by Beebe's researches and fully confirmed by Hunt's.

We may therefore accept it as practically demonstrated by these researches that the oxidation of alcohol in the liver is simply one of the defensive activities of that organ. That is, the oxidation of alcohol in the liver is a *protective oxidation* and belongs strictly to the same category with the oxidation of uric acid, xanthine bodies, leucin, tyrosin, and the amido acids.

The next question which arises is, why does the liver select alcohol first and oxidize that substance to the exclusion of other toxic substances, up to the limit of its oxidizing capacity? The answer is probably to be found in the chemical composition of alcohol.

Alcohol oxidizes very easily, much more so than any of the other toxic substances which gain access to the liver. Its early oxidation may be due to this fact alone, or it may be due in part to an actual selection by the liver.

C. The Energy From Alcohol Not Available.—Is the energy liberated in the oxidation of alcohol in the liver available for the use of muscles, nervous system or glands? If this question is answered affirmatively then alcohol is a food. If negatively, then alcohol is not a food.

All body oxidation may be classified in two groups: (1) *Active Oxidations* which take place in the active tissues, muscles, nervous system or glands,—and take place incident to action. Active oxidations are under perfect control of the nervous system and are proportional to normal activity. (2) *Protective Oxidations* which take place in the liver. This class of oxidation process is wholly independent of the usual tissue activity and is proportional to the ingestion of toxic substances and independent of muscular action, brain action or gland action, (other than liver action).

If the oxidation of alcohol in the liver belongs to Class 1, the following consequences should be found: First, the ingestion of alcohol would lead to an increased muscular power and an increased capacity for brain work, and increased glandular activity. Second, the ingestion of alcohol would serve to maintain body temperature in the healthy individual subjected to low external temperature. Third; the increase of muscle, brain or gland activity would be proportional to the amount of alcohol ingested. Now laboratory observations and general experience show that none of these things are true. That is, the ingestion of alcohol decreases muscle, brain and gland work and depresses body temperature when external temperature is low. The oxidation does not therefore belong to Class 1.

If the oxidation of alcohol in the liver belongs to Class 2, the following consequences would be found: First; the ingestion of alcohol would be followed by its early oxidation in the organ in question. Second; if the oxidation capacity of the liver is limited this capacity may be overloaded by exceeding the physiological limit of alcohol. Third, if the oxidation capacity of the liver is taxed nearly to its limit, by the oxidation of uric acid, xanthins and other toxic substances, the ingestion of alcohol may seriously interfere with this protective oxidation by overtaxing the capacity. Fourth; if the oxidation capacity is overtaxed an excess of uric acid, xanthin bodies, and other toxic substances will get by this portal and reach the active tissues of the kidneys. Now all of these things take place, so we are forced to the conclusion that *the oxidation of alcohol is a protective oxidation.*

ALCOHOL IS, THEREFORE, A TOXIC SUBSTANCE AND NOT A FOOD IN ANY SENSE.

In the light of this presentation the significance of Dr. Hunt's work becomes very clear. The alcohol given to the animals taxed the oxidation capacity of the liver to the limit and left the organism defenseless against bacterial or other toxic substances.

III. Alcoholic Beverages.

Alcoholic beverages contain from 33% to 40% of ethyl alcohol. Beers and ales contain the lower percentages of alcohol. Whiskey, rum and brandy the higher percentages, while wines are about midway between.

No alcoholic beverage has so low a percentage of alcohol as to be without danger. The amount imbibed by the addict is usually so much that the alcohol taken exceeds the *"physiological limit,"* that is,—there is more alcohol taken than can be oxidized in the liver, so that there is an escape into the general system not only of deleterious toxines, which should have been oxidized in the liver, but also of the excess of alcohol, which is carried to brain and to muscles, seriously disturbing their normal activity and decreasing their efficiency.*

EFFECT OF METHYL ALCOHOL UPON THE HUMAN ORGANISM.*

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Methyl (or wood) alcohol is a deadly poison, and the sooner the inhabitants of this country become cognizant of that fact, the longer will they live to enjoy the benefits and glories of this great land.

When one considers that one out of every twenty artisans come in daily contact with it in the arts and industries, and that a still greater proportion, if we consider its use in the household, in cooking and in the form of extracts, liniments, patent medicines, jamaica ginger, witch hazel, bay rum, hair tonics, Florida water and Eau de cologne, which have been responsible for poisoning in drinking among women, the necessity for knowing about its poisonous qualities becomes at once apparent. Irrespective of its mode of entrance into the organism its action is the same. When its vapor is inhaled in a confined space it is just as poisonous as if the same quantity had been imbibed, as evidenced by the many cases of partial or total loss of vision and death observed in workers varnishing the interior of beer vats, in closed rooms, lead pencil varnishers, hatters, metal workers and others. While a greater number of cases of poisoning have resulted from drinking cheap whiskey, etc., where methyl had been substituted for ethyl alcohol on account of its lessened cost, its poisonous effect will assume greater importance in the near future on account of the occupational health insurance laws about to be enacted, which will concern every industry in which it is used, on account of the possible danger of poisoning from inhalation or absorption while handling it.

Many cases of poisoning by the imbition of methyl alcohol have occurred among the foreign-born element of our population. Accustomed to the use of ethyl alcohol in their mother country, they bring their habits to the land of their adoption, and as they think that all alcohols are alike, they buy methyl alcohol, which is cheaper and recommended as just as good, to make their home-made wines, whisky and cordials, by adding rose leaves, caramel and different coloring and flavoring extracts; and the results are well known to all ophthalmologists, as the majority of those affected suffer either from loss of vision or life, as the penalty for having imbibed it. The statement that methyl alcohol has been recommended by dealers as being just as good as ethyl alcohol appears difficult of comprehension, but it is an established fact which can be substantiated by noting the testimony adduced in the convictions obtained in New York City by the Board of Health, of druggists selling paregoric made with methyl alcohol, and others selling methyl alcohol not properly labelled, when ethyl alcohol was ordered.

One of the excellent results accomplished by the New York City Board of Health, and for which it should be highly commended, is the enforcement of the law relating to the sale of methyl alcohol, which makes it unlawful to sell any article of food or drink, or any medicinal or toilet preparation intended for human use internally or externally, which contains any methyl alcohol; and, furthermore, that no person shall sell any methyl alcohol unless the container in which the same is sold shall bear a notice containing the following device and words conspicuously printed or stencilled thereon, viz:

Skull and Crossbones—Poison. Wood Naptha or Wood Alcohol. Warning. It is unlawful to use this fluid in any article of food, beverage or medicinal or toilet preparation for human use, internally or externally.

Now, if the various city, state and national boards of health would follow their example there would be a diminution in the number of cases of blindness and loss of life, a large saving to the state in the cost of maintenance of the blind, a gain in the economic value by the conservation of life and vision, not counting the benefit to society by the preservation of the household intact.

Formerly methyl alcohol was considered the least toxic of the alcohols, but recent researches and clinical observations have demonstrated that it is one of the most toxic and dangerous to mankind, especially the refined spirits, on account of the absence of any distinguishing odor to indicate its presence. This toxicity is due in no small measure to its slow rate of oxidation and to the fact that it is converted into formic acid which is many times more poisonous than the original methyl alcohol itself. Most drugs after absorption into the blood appear to have a specific action on special tissues; some undergo a chemical change in the liver, while others are retained for a time in the blood stream. Methyl alcohol apparently possesses all three characteristics, manifesting a selective action for the nervous elements, and it is especially observable in those of the eyes. While 90 per cent. of the ethyl alcohol absorbed is oxidized into carbonic acid and water in fifteen hours, and the remainder being completely oxidized later, only about 40 per cent. of absorbed methyl alcohol is oxidized in forty-eight hours, forming formic acid, 25 per cent. is eliminated in the urine, perspiration and breath, the remainder requiring a longer time for oxidation circulates in the blood stream producing a continuous toxic effect. The organism endeavors to eliminate a considerable part of it through the bile, which after entering the intestines is reabsorbed, thus forming a vicious cycle.

Physicians at times fail to recognize cases of poisoning with methyl alcohol, diagnosing acute cases as ptomaine poisoning, and chronic cases on account of the possibility of their being masked under obscure disorders of the digestive tract and nervous system and being attributed to other causes by the patients, have been treated for chronic gastritis, hepatitis and enteritis.

There is undoubtedly a difference in the susceptibility of individuals to the toxic effect of methyl alcohol, due partially to the rate of oxidation which occurs, also to the condition of the individual at the time of absorption, whether the stomach is empty or full, and also to that condition known as the personal idiosyncrasy. The quantity required for manifesting its poi-

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sonous effects varies according to the susceptibility of the individual, the ingestion of one teaspoonful has produced death in some, and in others the same amount has produced permanent blindness. The poisons formed in the system as a result of the introduction of methyl alcohol into the body are very diffusible and penetrate the eyes very readily. A short time after its ingestion the chemical reaction of the blood serum and aqueous humor of the eye is changed to acid reaction, as a part of a general acidosis due to the increase of the H-ion content of the blood. Symptoms deduced from personal experimental researches and clinical observation of methyl alcohol poisoning are dependent upon the intensity and rapidity of the toxemia produced. In acute poisoning headache, vertigo, nausea, cardiac depression, profound muscular weakness, dyspnoea, dilated pupils with loss of light reaction, loss of vision, varying grades of optic neuritis, edema of the retina, hypotension of globe with diminished sensibility of the cornea, are present, while lowering of the body temperature is marked, which is due to the profuse clammy perspiration, dilatation of the peripheral vessels, loss of mobility and the interference with the temperature regulating mechanism of the body; loss of consciousness, coma and death may follow from respiratory paralysis.

If recovery ensues vision improves followed later by a diminution in the visual acuity, with changes in the visual fields and central scotomata for colors, especially red and green, due to partial atrophy of the optic nerves with degeneration of the ganglion cell layer of the retina.

In chronic cases the symptoms are milder and apt to be more obscure generally. Usual complaints are of headache, nausea, vertigo, weakness, color of voided urine very dark, with occasional obscurations of vision and confusion in distinguishing colors, vision subnormal with central scotomata for green or red and scattered scotomata or contraction in visual fields. Fundi of eyes show slight degrees of retrobulbar or optic neuritis, both are usually affected, one a trifle more intensely than the other.

In acute cases the changes in the blood comprise an increase in the erythrocytes, leukocytes, hemoglobin and polymorphonuclears, with a decrease in the lymphocytes. The acidity, specific gravity, electro-conductivity and viscosity are increased, while the coagulation time is reduced. Congestion with minute hemorrhages in brain, stomach, intestines, liver, spleen and kidneys are found at autopsy. In the chronic cases fatty degeneration of the tissues ensues, especially in the liver, heart, kidneys and lungs, with congestion and inflammation of the meninges of brain and of some nerve centers.

The effect produced in the eyes is especially interesting on account of the opportunity afforded of observing the changes occurring in the tissues with the ophthalmoscope, both in the acute and chronic forms, and in the ability to postulate therefrom the effect on the nerve cells in the brain.

The difference in the intoxication produced by ethyl and methyl alcohol is that the one produced by ethyl commences quicker and subsides more quickly, while that produced by methyl is slower in its incipiency, more profound and persistent and slow in recovery, and is decidedly more toxic.

While in the past, treatment for poisoning by methyl alcohol has been unsatisfactory, as a result of the better understanding of its action, hope of overcoming some of the evil effects produced by it may be entertained, if treatment is instituted early, and continued persistently, remembering that one is dealing with a virulent and cumulative poison. Treatment consists in elimination and stimulation, stomach pump, emetics, hydragogue cathartics, diuretics and diaphoretics, hot saline packs, high saline enemas, strychina, caffein, ammonia, oxygen and sodium iodide are recommended.

In conclusion, let us each and every one resolve to exert our best efforts toward enlightening the public as to the immense power to do harm which is stored within the liquid designated methyl alcohol, and to emphasize the fact that it is unsafe to use either internally or externally, or if inhaled in a confined space; and, furthermore, to aid in formulating safety laws and regulations for those who are compelled to handle it in the industries; remembering that it is better and easier to preserve life and conserve vision than it is to restore them after having been lost.

47 West 51st Street.

THE EFFECTS OF ALCOHOL ON THE EFFICIENCY OF MILITARY MEN.*

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The possibilities which face the United States after peace has been restored in Europe make it obligatory upon our nation to enter into a state of thorough preparedness. Not only should there be a material increase in the regular army, navy and the national guard, but every known measure should be adopted to increase the efficiency of their personnel.

The army and navy officer should be regarded as an expert of the highest class, whether charged with the purchase of supplies and equipment, the manufacture of arms and ammunition, caring for the health of the command, the construction of dreadnaughts, or the command of troops and battleships.

In order to attain success in war, as well as in other walks of professional life, the individual must preserve his general health, which is the keynote to efficiency and success, and from an experience of over forty years as an army medical officer, I know of no factor which contributes more to the general health and efficiency than total abstinence.

Apart from its bearing on the health and preservation of the human race, temperance has become a cold-blooded business proposition, which is assuming great importance in the commercial world. Professional and business men everywhere have learned that the drink habit unfits men for the ordinary pursuits of life.

Railroad managers are generally prohibiting the use of alcoholic beverages among their employes, especially among locomotive engineers, train despatchers, telegraph operators and switchmen.

This is also true of steamship companies, street car systems, factory operators, schools, colleges, banks, and among artisans generally. Laws have been passed in many states regulating the alcoholic habit of chauffeurs in the interest of the public safety.

At one time the War Department seriously contemplated the issuance of an order making total abstinence compulsory among army aviators. Flying, above all things, requires a cool head, clear eye and a steady hand, conditions which are absolutely impossible even with moderate drinkers. No one will ever know how

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many of the aviators who have lost their lives have alcohol to blame for the tragedy.

Many interesting experiments have been made by military men and others to determine the effects of alcohol on mental and physical efficiency. During one of General Wolseley's campaigns he divided some of his men into squads for marching experiments. The first squad was given a daily ration of whiskey, the second a ration of beer and the third water. At first the whiskey squad marched gaily ahead, but was soon overtaken by the beer squad, which, in turn, was passed by the water squad. The water squad followed an even gait, and after passing both whiskey and beer squads, reached its destination long before its competitors.

Lord Kitchener allowed his men no spirits whatever during his campaign in the Soudan. Lord Roberts was equally firm in encouraging abstinence from alcohol. Dr. Wahlberg, surgeon-in-chief of the Finnish army during 1877-8, said non-drinkers endured better and that the old drinkers were the first men to break down.

The Boers, whose endurance was generally commented upon favorably, used neither spirits nor beer. Sir Frederick Treves, who served at Ladysmith, says that the drinking men fell out and dropped as regularly as if they were labeled with the big letter "D" on their backs.

Lieut.-Col. Edmond Monkhouse Wilson, Royal Army Medical Corps, says: "Exertion of the body is better borne without alcohol; this has been proven conclusively." That total abstinence is a great factor in maintaining the physical condition may be learned from the habits of all great athletes and pugilists, who make a success of their careers.

Even the Roman gladiators, who spent months in training for mortal combat, were total abstainers. Major Blackham, of the British Army, states that "alcohol is unnecessary in any form in any quantity, under any circumstances that may occur in military affairs."

During the Swedish alcoholic investigation among soldiers, a number of picked non-commissioned officers and men were selected for rifle practice. The tests covered a number of days, part of which time the men were tried out with small quantities of alcohol, about 1½ ounces of brandy. When alcohol was taken during the quick fire the hits were 30 per cent. less, though the men imagined they were firing quicker. During slow aiming the difference was 50 per cent. in favor of abstaining days.

During the marching test some of the men were allowed alcohol, while others were deprived of its use. The drinking men were found inferior in marching and enduring qualities; besides all of the sun strokes and heat exhaustions occurred among the drinking class. As a result of these series of experiments the Austrian soldier is not allowed to carry brandy on his person, as was previously the case.

A series of interesting experiments were conducted by Prof. Exner, of Vienna, to determine reaction-time of the brain with and without alcohol, and it was found that no one's intellect was at its best even under the moderate use of this drug. The experiment was conducted as follows:

The subject was placed at a telegraph table with finger on the key, and at the flash of light was required to press the key. It was proved that the reaction-time of imbibers was lengthened over that of abstainers, even when small quantities of alcohol were taken.

A number of complicated experiments were made on reaction-time, involving color signals. A telegraph key was placed on the right and the left of the subject and signalized by alternating flashes of red and white light. It was proven that more mistakes were made after the ingestion of one glass of beer than before it was taken.

Other experiments were conducted with drinkers and abstainers on the reaction-time of reading letters through a slit in a revolving wheel. More mistakes were made by the imbibers than abstainers, and besides, the memory of the former was more impaired, as shown by their inability to repeat a number of letters after a short interval. Experiments made on this line show alcohol retards cerebration and has an important bearing on the work of the Signal Corps.

The countless experiments performed by Voit, Schumberg and Schäffer have proved that alcohol neither creates nor promotes brain energy nor muscular activity. By means of the ergograph, Dr. Schnyder and Professor Dubois proved that an individual who imbibed one ounce of alcohol lost 8 per cent. of his muscular power when compared with normal labor without alcohol.

From the studies of Metchnikoff, Masset, Bordet and other investigators, we have learned that alcohol materially interferes with the immunizing functions of the leucocytes and the blood plasma against microbic infection.

Physicians especially are aware of the large mortality which results from pneumonia, erysipelas, typhoid fever and other diseases of a microbic origin among drinking men. A man from 40 to 60 should enjoy the most useful part of his career, provided he has led an abstemious life, especially with reference to eating, drinking and exercise.

Besides, alcohol has a special predilection for the central nerve cells of the gray cortex of the brain, which are directly associated with the highest intellectual processes. A painful and marked psychological change takes place in the intellect and mental attributes of the persistent drinker as the years pass. The once brilliant intellect becomes common place, while ambition, energy and high aspirations fade away, to be replaced by absence of purpose, indolence and a lowered moral tone.

A marked contrast is usually observed in the physical condition of the drinking soldier and the abstainer who have arrived at middle age and always in favor of the latter. No one who studies statistics can fail to observe the large number of deaths which annually occur among men and women of social prominence between the ages of 40 and 60 years as a result of diseases of the heart, kidneys, liver and blood vessels, which are largely due to high living and alcohol.

The use of alcohol as a beverage among troops contributes more to camp diseases, and detracts more from efficiency than even poor camp sanitation. This was true during the recent Spanish war and Philippine insurrection, when at one time the admission sick rate reached 3,000 cases per 1,000.

Especially was this true of venereal diseases, which stood for years at the top of camp diseases in our army and became a subject of congressional discussion. Alcohol plays such an important role in the contraction of venereal diseases, that it is questionable whether more than 5 per cent. of this morbidity occurs among the abstaining class. Venereal diseases are intimately associated with two of the most prominent sociological problems, alcohol and prostitution, which together are the principal factors in the mental and physical degeneracy of the human race.

During 1898-1902 the Government permitted the unlimited introduction and distribution of all kinds of alcoholic beverages among the army of 70,000 regular and volunteer troops which were on duty in the islands during that period. As a result of which the admission rate to sick report ran up four or five times as high as the present rate in the United States.

While a large amount of this sickness was no doubt due to climatic influences and poor sanitation, at least fifty per cent. of the excess was due to the use of alcohol. Hundreds of the men were invalided home on account of intestinal and stomach troubles, insanity, neurasthenia and other forms of neurosis, due more or less to alcohol, ninety-five per cent. of whom recovered before they had reached San Francisco during the month's voyage of return.

Mental diseases, expressed by certain forms of insanity, were exceedingly common among our soldiers during the Philippine Insurrection, and while it is difficult now to trace the etiological factor in each case, I am satisfied that 90 per cent. of them were directly or indirectly due to some form of alcohol. Many of the cases recorded on the sick reports as "heat stroke" or "heat exhaustion" resulted primarily from alcohol.

Besides sickness and loss of efficiency in the army as a result of alcohol, we know that practically all of the crimes and military offenses committed in military circles are due to the use of intoxicants. All of the murders, suicides, court-martials and dismissals of officers, prison and guard house sentences of the enlisted men, fights, brawls and desertions are usually confined to the drinking element.

In permitting the use of alcohol beverages in our military services, the Government has not only handicapped the efficiency of both army and navy, but has added unnecessarily to the burden of the retired and pension lists. For without question alcoholic excesses were responsible for the broken down health of many of our officers and men who were retired or pensioned while still in the early or middle ages of life.

From a careful study of the effects of alcohol on the human organism I find that:

I. As a beverage it lowers all the mental faculties, such as judgment, memory, perception, thought, comparison, caution and quickness of action.

II. It lessens working capacity, marching endurance, accuracy and rapidity in rifle firing, ability to command troops or navigate ships, to act as members of military courts or boards, or to perform the higher administrative duties of official life.

III. It causes sickness, impairs health and usefulness, adds greatly to the non-efficiency of officers and men, increases the burden of the medical department in times of peace and war, deprives the government frequently of the services of those who drink, and increases unnecessarily the retired and pension lists of the army and navy.

IV. It lowers the moral standard, lessens self-restraint and is productive of unreliability, untruthfulness, dishonesty and crime.

March 18, 1902, the Secretary of War issued a circular to the army inviting attention to venereal diseases and alcoholic addiction, which was introduced by the following remarks: "The only really efficient way in which to control diseases due to immorality is to diminish the vice, which is the cause of these diseases. Excessive indulgence in strong drink is absolutely certain to ruin any man physically and mentally, while diseases due to licentiousness produce effects which are quite as destructive and even more loathesome."

All of the nations engaged in the great European struggle recognize the effects of alcohol on the efficiency and health of their troops, and have interdicted or curtailed its use. This has been the case with Russia, France, Germany, England and other nations among the lesser powers.

If the United States expects to stand as a great power among the nations of the world from a military standpoint, it will become necessary to enforce total abstinence among the commissioned officers of the army and navy before topnotch efficiency can be secured.

Besides total abstinence among the commissioned list, the necessity of strict temperance should be impressed upon the rank and file, and every measure taken to safeguard the men against the use of alcoholic beverages, especially during active service.

Medical officers, who are practically on duty at all times, should especially be prohibited from the use of alcohol, because it unfits them for the care of serious medical cases or the performance of important surgical operations.

Every officer in the army and navy necessarily relinquishes in part his personal liberty for the honor of serving his country and the compensation provided by the Government in the way of active pay and emoluments, or retired pay for age or disability.

For this and other reasons the government has a right to require every officer in the army and navy to safeguard his health against the ravages of disease or vicious habits. Officers and men are required to submit to vaccinations for small-pox and typhoid fever, prophylaxis against venereal diseases, and why not against the use of alcohol, which is one of the greatest factors in the reduction of efficiency and the general health of an army.

THE PSYCHOLOGIC INTERPRETATION OF ALCOHOLIC INTEMPERANCE AND ITS PHYSIO-PSYCHIC TREATMENT.*

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By way of introduction to the theme that has been assigned me, I beg your leave briefly to describe the weapon with which I strike at the physiopsychic complex involved in every case of alcoholism.

There exists in human beings a mass of latent unused power—a reserve fund of energy, or capacity for performing work, which is applicable to emergencies, to extraordinary demands on the fortitude, exalted control, innate aptitude, or regenerating faculty of the individual. It is this power that may be incited to control the psychic elements in all diseases, and so effect the cure of those that are functional and the alleviation of suffering in those that are organic. It is this power that commands the output of thought, the projection of genius, the material expression of all that is best in the man. It is this power which, dynamically directed and applied, regenerates the outcast, sobers the drunkard, rescues the drug-fiend, restores to normal thought and feeling the distraught and suicidal, the perverted and the obsessed.

Its expression implies the existence of a personal, immaterial, intelligent element in which it inheres. Something lives and rules outside, and yet pertaining to, the man we see and know and associate with, that conditions his intellectual and moral expression and controls his very will. And this something is other than God. It is variously known as the subconscious mind,

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the subliminal self, the superior spiritual personality. Granted supersensible power immeasurable and universally applicable—accepted its latent residence in the superior cosmic human self, how is it to be exploited? How can this abeyant efficiency be harnessed and made available in the work-a-day world? The answer is, through Suggestion, which is nothing more than an earnest, straightforward, dynamic appeal to the higher self. The object of suggestion is to establish self-control in physical, mental, or moral relaxation; to impart pluck, push, nerve, self-reliance to the mortal mind; to strengthen the will; to bring into personal touch with the truth, which always emancipates. Suggestion, in other words, makes efficient, and efficiency in a state of perfect action is happiness.

There is no subjection to the will of another in psychotherapy. Nobody but a fool would submit to such treatment, were this possible; and nobody but an unprincipled operator would practice, even for the relief of suffering, a method that makes a fellow-being his automaton. My subjects do what I urge them to do, *not because I urge them,* but because they are made clearly to see that the course suggested conjugates with right, truth, expediency, necessity.

One of the most important applications of psychodynamics is its combination with rational physical attention in the treatment of drink and drug habits. The results here obtained are without parallel, dependent as they are on the automatic operation of a superphysical control rendered active by a resistless appeal. The drink and drug cures so extensively advertised fail utterly to impart the great essential to radical regeneration and lasting abstinence—viz., spontaneous undesisting moral sway. They evoke not those forces of the soul that are a thousand times stronger than appetite or desire. Hence about 70 per cent. of drinkers who seek relief at the sanatoriums are sobered only for a time and sooner or later relapse. The drink habit can not be cured by nauseating the victim with lobelia, purging him with drastic cathartics, blinding him with belladonna, or vomiting him with apomorphia. Such treatment creates a revulsion in the patient. He soon recovers from the effect of the physic used to find his craving unchanged and his powers of resistance as foisonless as ever. *Drug cures leave the moral nature uninfluenced.* Dr. Partridge of Clark University convincingly contends that no drug can reach the heart of the intoxication impulse.

To all such treatment, which turns absolutely on the faith of the patient, how incomparably superior must be that which enthrones the image of the Eternal in the man, the god part which stands behind that faith and makes it possible. This elevation of the Ego to sovereign and consummate power is what exalted suggestion accomplishes. In the speaker's experience, covering 1,200 cases of alcoholic inebriety, and according to reports in foreign medical journals, at least eighty per cent. of those who accept it may be saved; and if all who seek transfigurement could be persuaded to carry out unremittingly the directions given until the damage done the brain should be repaired, that percentage might be raised to 100. Of the 1,200 cases treated psychovitally by me, 20 per cent. seemingly failed to respond. Of these a number cannot be traced; a number indifferently submitted to one or two treatments out of deference to the entreaties of friends, and hence there was no objective self-surrender; a few, through their excesses, had entered the syndrome of alcoholic dementia; some were society women, who, in my experience, are almost without the pale of hope. On the whole, however, in no other condition that I have been called upon to treat by suggestion, am I warranted in saying to the sufferer: "If you sincerely desire to be cured of this malady, and will carry out my instructions faithfully for a year, you can be cured beyond a peradventure."

The drink habit is growing, especially among city women, from shop maid and *nymph du pave* to the pampered dames of upper society. The punch bowl figures at functions, and proud-pied belles dip freely therein. Cocktails and highballs are everywhere on dress parade, and the wanton cordax has been revived by dance-mad, up-to-date Bacchantes amid the hocktide familiarity of the roof-garden and the misnamed thé dansant. Girls representing good families, conspicuously made-up, are not missing from the throng. Debutantes, not necessarily of the fast set, unblushingly assert a right to drink wine and smoke cigarettes at luncheons and levees, at high-priced cafes and in the corridors of the hotels; and not a few of this class, as well as young married women, have been brought to the writer's office in a state of intoxication. Such has become the vogue; and, worse than this, girls in their teens see no impropriety in drinking publicly with men companions. A few years ago, a woman with a cocktail before her amid such surroundings, polluting the air with tobacco smoke, would have been set down as a cyprian. The abstinent, unobtrusive young lady of the past generation is giving place to the coarse boisterous, immodestly attired bon-vivant, controlled by unworthy impulses, and wholly unfit to fulfill her function in the community as an inspirer to meritorious action, or her function in the home as a character-former, a wife and a mother. Verily, the *beaumonde* reflects a piteous state of preparedness for combat with the forces of evil that threaten to disrupt society. Verily, the national force that is wasting to-day in America is woman; and she who prostitutes her obligation to her sex in a life of self-indulgence and demoralizing example should be brought to her senses by the thought that no nation can be truly great in which the rights of woman are not deservedly upheld, and her refined intellect is not respected as a directing agency and an impelling power.

What has been said is germane to the attitude of the well-to-do classes, for with the great mass of working people in the cities, the habit of drink is noticeably on the wane; and the saloon-keepers who have long absorbed a generous fraction of the laborer's hard-earned wage fear for the future of their nefarious business of "swapping the souls of men" for mammon. The poor or moderately salaried man is not only developing a knowledge of the perils of alcoholic indulgence through the strenuous efforts of both Catholic and Protestant educators, but he recognizes the necessity of economy, and has come to appreciate the superior attractions of the photo-drama. The moving picture-show is the great adversary of the saloon. In its comfortable parterre, a man may be entertained with his family an hour or two for less money than he would naturally spend in the card rooms that figure at the rear of every bar. These clubs of the poor, where the man of labor and the youth of the store pass their evenings in drinking and card playing, are dehumanizing our brothers of the tenement, aiming to destroy their capacity both for conferring and enjoying domestic happiness. The moving picture show offers a form of instructive entertainment that is cheap enough to be within the reach of all working people, and popular enough to drain the lounging-rooms of the cabarets. The saloon is out of step with the times.

But independent of the contingent of working people who are abjuring alcohol in the cities, the prevalent

wholesale addiction to the use of stimulants—with its accompanying degenerations of organs; its pernicious influence in the causation of pulmonary disease; its marked action in increasing the mortality rate in the case of all diseases, about 15 per cent. of all deaths being due to such action, directly or indirectly; the part it plays in the induction of insanity, standing as the greatest single independet cause of mental downpitch; and its tendency to transmit to offspring not only epilepsy, deaf-mutism, and mental enfeeblement, but marked criminal propensity—is assuming proportions so appalling that it may justly be regarded as perhaps the greatest existing menace to American institutions.

The opinion of the medical profession in regard to the use of alcohol as a beverage and a therapeutic agent is distinctly unfavorable to-day. Physicians look upon it as a protoplasmic poison, and are advising against its employment where it was once warmly recommended, as, for instance, in nervous depression, dyspepsia, insomnia and tuberculosis. We now know that alcoholic drinks interfere with digestion, predispose to cardiorenal and pulmonary troubles, and impair the elimination of toxins created in the body which are the cause of gastric acidity, sleeplessness and general neurasthenia, as well as of high blood pressure and premature arterio-sclerosis. Thus the use of alcohol indirectly contributes to the development of a form of arterial degeneration designated as hardening, which is directly due to auto-intoxication accentuated by the ingestion of this poison. The majority of people overeat and under exercise. Sixty per cent. of Americans work indoors at sedentary vocations, and these drink moderately as a habit, and oversmoke as well, in response to the demand of the system depressed by a superabundance of food that cannot be disposed of, and of unnatural work that keeps up the demand. What these persons drink to reinforce nervous energy is itself a most dangerous compound made of crude grain or potato spirits, or fusel oil, and various "essences" manufactured in laboratories—a compound sixteen times as deadly in its effects on the brain and other organs as is ethyl alcohol in pure whiskey. And the beer and ale of this country all contain sulphurous acid and other adulterants, much of its preservatives, rendering it antagonistic to digestion which is a form of fermentation, and constituting it a kidney and liver irritant which has to be reckoned with by the doctor and is taken into serious consideration by life insurance companies.

In spite of these accepted facts, drinking goes madly on. A discussion of the psychology of the habit would seem to imply a presentation of the various reasons advanced by intemperants for their addiction to "the Juice divine" (Rubaiyat).

Some drink to hide conditions that mortify, worry, depress, or agonize—business entanglements, loss of wife or finacee, blood-guilt. Like Omar Khaiyam, they drink inconsolate, not for pleasure or profligacy, nor to renege religion and good morals, but solely to drown care and escape fro mthemselves. How often is has to be demonstrated to these deluded patients that obscuring conditions does not alter them, but merely renders the dupe less capable of coping with them. "To drink my wine and take my pleasure," said the Persian poet, "that is how I live. To care no jot for heresy or orthodoxy, that is my creed." Yet heresy and orthodoxy continue to exist, and the man's responsibility is none the less. Many men drink exclusively from habit and not from desire for intoxicating effects. Many again plead business necessity; others, lowered nerve tone, and whip themselves to greater effort, forgetting that in the lash of the whip is hidden a scorpion's sting. And some fools who have been cured touch, handle and taste in cold blood to see whether they really are cured, often with disastrous consequences that are likely to follow playing with fire.

A popular fallacy with the alcoholic is the progressive conviction that, in consequence of a long period of good behavior, he is entitled to a spree. This applies to patients who are willing to take a six months' voyage on a sailing vessel innocent of liquor, or be interned in a sanatorium, perfectly happy and apparently without desire, but living on the expectation of "going on another whizzer," as one patient denominated it, as soon as the ship docks or the sanatorium doors are unbarred.

Many drink in a spirit of conviviality for the frolic of it, on the principle that mad men only scorn the cup. Bad rendezvousers coochee the weaklings to periodical debauch. But no one cause explains all drinking. Perhaps the dominating impulse among intoxication motives is the desire for abandon, ingenital in every human being, that finds vent at felicitous season either in legitimate or illegitimate diversions. Some turn to wild nature and work sedulously for eleven months in anticipation of one beneath the branch or by the stream that chatters through the meadow—some to the ball games or golf links, or the voyage on a favorite yacht. This tendency to dissipation was conspicuously exhibited in the Elizabethan period by the great thinkers of the age who descended at times from their intellectual thrones at Oxford and Cambridge to debauch themselves in the moral mud of London. I once took to task a Boston clergyman of note, my angling companion, for profanely deploring the escape of a large trout, and was told by way of excuse that the utterer of oath was on a moral vacation. Similarly, multitudes of periodical drinkers abandon themselves at convenient intervals to rmoal vocations, whose mental delights they color with alcohol amid the psychological stimuli of a convivial environment.

Such is coney-caught human nature; and these are the psychic causes of alcoholic indulgence that an observer through many years of study has inferred. In conflict with the variform psychology, drugs are powerless. Objective entreaty, affection for wife and child, business interests, impending breakdown and threatened dementia—all take the foil in impotent protest. As the causes are mental and it is the mental effect the drinker seeks, the disease must be grappled with through mental instrumentalities. And there is nothing in the several psychological attitudes that offers the slightest obstacle to the currents of soul power when undammed by dynamic suggestion. The physical effects, the ravages of the poison, demand for their removal the intelligent and fearless application of remedial measures that long experience has proved to be operative. The drunkard temporarily cured of his thirst is not, in a rational scheme of treatment, to be turned loose into the world handicapped by toxins, crippled organs, or shattered brains. Months may be required fully to repair the damage inflicted and panoply the drinker against all danger of physical temptation. It cannot be done in days, as a hundred and one enthusiasts advertise. There is a great difference between sobering a drinker with cathartics and permanently curing him.

It has been shown that abundant adequacy exists in the man to destroy any and all abnormal craving of his objective nature, and that this dormant power may be awakened and exploited by suggestional appeal. The suggestions given in drink habit cases must be iconoclastic and uncompromising, for radical cure depends on change in the mental state.

The patient is conducted into the subliminal sphere, and then assured that, in accordance with his own desire, he has lost all craving for stimulants; that alcohol in any form is a virulent poison, and, as a safeguard, that he cannot swallow it, cannot carry the containing glass to his lips. The society of dubious trencher-friends is tabooed; the pleasures associated with drink and the glamour of the bar-room are pictured as meretricious and placed in vivid antithesis to the chaste delights of home life. The physical, mental, moral and economic bankruptcy that accompanies intemperance is held up with realistic cogency before the view of the sleeper, and he is forced to the conviction that begotten of this apprehension has come into his soul an abhorrence for drink and all that it stands for. He realizes the presence of efficiency within him adequate to the enforcement of radical abstinence as the principle of his life; and he is rendered insensible, for the future, to any such combination of desire and opportunity as has usually constituted temptation. So he is constrained instantaneously to scorn recourse to alcoholic stimulants for any reasons, and to depend exclusively, under mental or physical strain, on the units of energy legitimately manufacturerd out of nutritious food , non-intoxicating drinks, air, exercise and sleep.

Constructively, the sub-personal mind is then directed to the occupation or the diversion, or both, as circumstances suggest; the idea that better work can be done under the influence of alcohol is dispelled; the nervous suffering and dangers that usually wait upon sudden abstinence are stood abeigh; and a career of wholesome activities and satisfactory success is imagined as the legitimate result of the abandonment of the compromising habit. The patient is left asleep an hour or more in the atmosphere of these convictions.

Your speaker has treated in this way persons who came to him unwillingly, who entered the sleep reluctantly with pronounced mental reservation, even men who defiantly sneered at his proffers of help. In many such cases, he has overridden a righteous impulse to eject them from the office, placing love for the sinner before hatred of the sin, has brought the subject into his own presence, made him aware of his obligations' with his power to meet them, and disclosed to him an earnestness and sincerity of purpose in the effort at reclamation. Such a patient generally emerges from the first sleep, always from the second, a changed being and happy in the change. The surly ruffian who had to be handled with the utmost finesse, is transformed into an affable and appreciative gentleman.

A psychological explanation of the difficulty experienced in regenerating certain persons is to be found in a change of personality in the subjects under treatment, with an accompanying change of behavior so marked as to intimate that a single organism is the abode of two distinct selfs. In offering suggestions, I have sometimes been interrupted by an alternating phase of the personality addressed, which replied to my impulsions in daring contradiction or threw the subject into a convulsive tumult. Two young women came to me last spring to be cured of alcoholic intemperance. Though only in the thirties, both had served a ten years' apprenticeship to excessive indulgence and both had seriously injured the brain. To each was given in a state of perfect suggestibility the uncompromising suggestion that whiskey thereafter would be a deadly poison and its ingestion would be followed by vomiting and serious illness. As a rule, women who drink are more unreasonable than men, and more susceptible to the dictation of alternating phases. Both these patients, under the pressure of moral dejection, played the Jekyl and Hyde act, both became dipsomaniacal at the bidding of a rebellious self-fraction, and both paid the penalty of the outraged suggestion above, through the active protest of an all-powerful, otherwise cohering personality. One reported at my office in a state of collapse, and was interned and cared for by my nurse. The other lady, after drinking a half pint of whiskey, was similarly affected at home, with the addition of lancinating pains over her whole body. She thought she was at death's door, sent for me, and was surprised to learn that she could not trifle with a suggestion accepted by her higher self without disastrous consequences.

The rational treatment of alcoholic addicts has been characterized as physio-psychic. This means that it does not lose sight of the necessity for physical repair. It recognizes the interdependence of brain and psychic offices, for in the light of modern science, "bodily and psychic functions are only different forms of the same brain and nerve activity." The successful carriage of the suggestions offered depends then on the integrity of these organs.

The pathology of alcoholic inebriety may not be discussed here. Be it understood, however, that the use of alcohol, at first stimulating, tends soon to diminish physical force as well as enfeeble mental faculties. Every debauch means a lowered sense tone, a partial functional paralysis of blood vessel sheaths somewhere or everywhere in the body, a deranged circulation with diminished absorption of nutrient substances and concomitant atrophic changes in cell protoplasm. Alcoholic patients also suffer from indicanuria. Putrefaction products absorbed from the intestine, poison the brain and so render resistance to temptation all but impossible. The alcohol, moreover, inhibits the elimination of these toxins, and so is established a vicious circle of causes that promote organic changes, notably in the heart muscle. Constant alcoholic anaesthesia shortly leads to mental reduction and finally to dementia. Nothing can be more pathetic than the sight of a man, once brilliant and successful, prematurely losing his value in the business world and rendered utterly irresponsible by drink.

These physical conditions are not overlooked by the conscientious practitioner, and response to the treatment accorded them is always suggested by the psychotherapist.

The psychological cause for alcoholic excess is not unfrequently emphasized by the depression and nervous irritation resulting from the abuse of tobacco.

Physicians who have had much to do with alcoholic inebriates realize that there is a direct relationship between alcohol addiction and such abuse. The first effect of tobacco smoking is stimulating, with a rise of blood pressure; a sedative effect follows, with a fall of blood pressure; and if the smoking be continued, the nerve cells are depressed. The depression is cumulative in the system of the smoker, and after a varying interval (of days, weeks, or months), it creates an instinctive demand for the antidote to tobacco poisoning—and that is alcohol. The intemperate use of tobacco thus explains 75 per cent. of all drink habit cases. The alcoholic thirst is engendered and inflamed by smoke.

The real danger in smoking consists largely in the habit of inhalation whereby the volatilized poisons are brought into immediate contact with at least 1000 square feet of vascular air-sac walls in the lungs, and are thus promptly and fully absorbed to be diffused into the blood and carried on their disastrous errand to the several organs of the body.

These poisons include, besides the chief active constituent, nicotin—ammoniacal vapors that dry the throat and liquefy the blood, carbon monoxid or illuminating gas that induces a drowsy, dizzy condition and disturbed heart action, carbon dioxid or carbonic acid gas, prussic acid in combination, sulphuretted hydrogen, and irritant aldehydes—all virulent nerve poisons, capable in a concentrated conjoint action of paralyzing the muscles of respiration and so causing death. Of the aldehydes, the one known as *furfuraldehyde*, found in inferior alcoholic drinks and said to be fifty times as poisonous as alcohol, occurs in the smoke of cheap cigarettes. According to experiments recently made in London, the smoke of a single Virginia cigarette is likely to contain as much furfuraldehyde as 2 ounces of whiskey.

Inhalers of tobacco smoke are listless, forgetful, undependable, backward in study, and conspicuously lacking in power of attention and application. A patient who began to smoke at seven and smoked all the time he was awake until as he described it he "got a jag on the smoke," at 35 could not "pin himself down to any business." As the habit is pushed, the habitue becomes excessively nervous, suffers from shortness of breath, muscular cramps and tremblings, rapid and irregular heart, nausea, giddiness, insomnia, irritable throat ("cigarette cough"), impaired digestion, and often from dimness of vision which has been known to culminate in blindness (tobacco amaurosis)—all which disappear with discontinuance of the habit.

Gravest of all the resulting evils is the lessening or complete loss of moral sensibility, with a conspicuous tendency to falsehood and theft. The moral propensities are eventually destroyed because of the destruction of those elements of the brain through which moral force is expressed. The victim degenerates into a sallow, unmanly, irresponsible incompetent, in splendid fettle for the penitentiary or the asylum. Such is the influence on character of the cigarette habit, which has developed into a form of moral insanity. Alcoholism cannot be cured until the inhalation habit is disposed of, and it cannot be disposed of without objective authorization by the patient. If there be mental reservation on this point, the smoking will be resumed and relapse be practically certain.

The government has begun a most meritorious campaign against drug-taking in the enforcement of the Harrison law. But it has left unnoticed two habits that are doing infinitely more damage to the brains and physical constitutions of the people of the United States than all the drugs put many times together, viz., the drink and cigarette habits. Three times the amount of our national debt (about $3,000,000,000) is spent annually in the country on alcoholic drinks and tobacco. Twenty billion cigarettes, it is estimated, are smoked every year in the United States. Boys and girls, men and women, are permitted without protest from high quarters to destroy their mental faculties and moral propensities by this practice. Physicians have come to realize that those who abandon themselves to the double indulgence in tobacco and alcohol are practically committing suicide on the installment plan. They can never be at their best, and a cigarette smoker represents as hazardous a risk from the viewpoint of life insurance as a consumer of liquor.

In closing, let me insist on one fact, viz., The ill-success of a given suggestionist in the treatment of an alcoholic or drug addict, does not imply that such a subject is incurable through psycho-dynamic influence. The sufferer should make trial of another personality. Especially is this to be considered in the failures of Emmanuelism, so noble in its conception and so successful in the hands of its founder, where cures are attempted by unqualified clergymen who are ignorant of the mental states in which receptivity is at its height, and apply extremely crude methods with faith in their efficacy. The same criticism applies to the quixotic efforts of theotherapy and the tedious procedures of psycho-analysis.

127 West 73rd St.

General Scientific

MEDICINE WITH ESPECIAL REFERENCE TO THERAPEUTICS IN 1915.

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The establishment of the American Congress on Internal Medicine during the year, which includes in its membership general medical practitioners, psychiatrists, neurologists, pediatrists and laboratory workers, is intended to co-ordinate the exponents of the various fields of internal medicine. The marked interdependence not only of the diseases but as well the interpretations as the result of study is so marked that correlation of work has become absolutely essential to one who would possess a broad and inclusive knowledge even if cultivating an exclusive field. The founding of the American College of Physicians has enabled those of the Congress who have attained notable distinction to bring about still further advances in internal medicine and at the same time to be brought together in an organization which shall further the interests of its Fellows.

The absorbing interest of the European war has been, from the standpoint of the military surgeon, largely of administrative and mechanical problems. On the medical side the brilliant success of antitetanus vaccination on the western front and anticholeraic vaccination on the eastern front and the freeing of the southern front from typhus fever are notable. The antityphoid vaccination has not yielded the uniformly satisfactory results which have been attained in our American army, probably due to defects in material and imperfection in technique.

The greatest usefulness of the physician, as estimated by the patient, is measured by the degree of success to which his treatment has attained. Therapeutic nihilism is now chiefly confined to writers of treatises upon pathology which are denominated practices of medicine. Pessimism as to the results of treatment is now giving place to a rational and healthy optimism based upon careful study and encouraged by such organizations as the American Therapeutic Society. Pathology has long ceased to be the whole of medicine, although its importance is not underestimated, and likewise pharmacology is not all of therapeutics much as it may underlie treatment. In this connection the graduates of a leading medical school from 1901-10 supply some illuminating information. About one-fifth specifically mentioned the lack of training in therapeutics which they received during their student days. It is only fair to state that the school in question is endeavoring to remedy this defect and doubtless will succeed in meas-

urably fulfilling the most important purpose of the medical school which is the training of competent practitioners of the healing art.

Last year we pointed out that success in the employment of twilight sleep demands (1) a high degree of technical knowledge of the physiological effects of scopolamine in general, and a special knowledge of the patient in particular; (2) a marked degree of technical obstetrical skill, and (3) uninterrupted attendance on the part of the physician during labor and absolute attention to details of administration. Evidently these three factors have not been found in frequent coincidence and the method appears at present to have but little vogue, and deservedly so, for the manner of the exploitation was certainly unworthy of an advance in scientific therapeutics.

Syphilis still claims attention and Williams points out matters for careful consideration. It is important to know that the poison is spread throughout the system long before the appearance of the secondary eruption, even before the appearance of the primary lesion as is shown by a positive Wassermann reaction, even in some instances on the day upon which the chancre was observed—in the majority of cases at the end of the third week. The frequency with which vital organs are attacked is really startling. Wertheim has found the spirochæta in all of fifty patients suffering from hereditary syphilis and in about one-half of one hundred and fifty patients suspected of having acquired syphilis. The localization of the spirochæta in the heart is more frequent than in the liver. The persistence of syphilis is quite as important; transmission of the disease twenty years after infection; the spirochæta in brain of paretics, in the spinal cord of tabetics, in the hearts of old syphilitics, and inoculations from these have been successful. We must revise our views of the period during which there is danger of transmission to others. A single negative Wassermann reaction is by no means indicative of cure. Alcohol causes it to disappear for from one to three days. About five per cent. of patients in the active secondary stage are likely to give a negative reaction. It often happens that a reaction which has become negative under treatment may become positive so that a series of negative reactions extended over a considerable period of time are necessary to establish a positive cure. The administration of salvarsan may be followed in from two to seven days by a positive reaction and such a provocative dose is established as essential before cure is first established. It must be remembered that positive reactions are the rule in gout, relapsing fever, leprosy and the febrile stage of certain malarial infections, and often in acidosis, carcinoma, pemphigus, septic conditions, tuberculosis and trypanosomiasis. Now that a reliable preparation of Noguchi's luetin text is procurable its use is likely to be more extensive. The treatment may be formulated as follows: Begin with mercury, preferably an injection, or if this is not available, with a week of inunctions, then salvarsan or neosalvarsan, beginning with a small dose. The mercury increases the resistance of the body so that the first dose is rarely followed by a reaction. The salvarsan should be continued for from four to six weeks and mercury should be given, either between the doses of salvarsan or for six weeks following it. Then it is probably better to give smaller doses in salvarsan twice or three times a week as it is more rapidly eliminated and very little is left in the system after forty-eight hours.

In latent and tertiary syphilis there is no general agreement as to what is to be done; the intensity and duration of the treatment must be decided upon after a careful survey of the conditions. In the tabetic and paretic, salvarsanized serum may be employed according to the method of Swift and Ellis. It is possible to produce considerable improvement in most instances of tabes and in some paretics in the early stage and in a few instances to check the disease. In congenital syphilis the mother must be treated, especially during her pregnancy. Mercurial treatment before pregnancy is of little use in saving the child, while active treatment with this drug before and during pregnancy will secure a high percentage of healthy children. Salvarsan and mercury, begun early and contained energetically gives even better results. If the fœtus is already infected it is doubtful if treatment of the mother will be of much benefit. Craig and Nichols propose as a standard of cure; one year without treatment, without any suspicious clinical signs, with several negative Wassermann reactions and no positive ones, and with a negative provocative Wassermann reaction and a luetin test at the end of the year. There should also be an examination of the spinal fluid. This is indeed rigorous, but nothing less is satisfactory. Williams remarks that if we are perhaps less confident of obtaining a cure in old instances of the disease, we can promise them at least a better chance than they formerly had and in recent instances the chances of eradicating the disease are enormously multiplied.

Pyorrhoea alveolaris has loomed large as a causative factor in many well known pathological conditions and from the standpoint of the work of Bass and Johns showing the constant presence of the endamoeba buccalis (E. gingivalis, Gros) is important. The brilliant results following the treatment of amœbic dysentery by the use of ipecacuanha in the early days in India and eventually by emetine hydrochloride in the present suggest the remedy for pyorrhoea. After success with this remedy hypodermically it was found that the interval use of the remedy was quite as effective so soon as the nausea, which even half a grain of emetine produces, could be obviated. The problem was merely to find a substance which would permit the alkaloid to pass through the stomach unchanged and to become active in alkaline intestinal contents. Such a substance was found in hydrated aluminum silicate with the result that the pyorrhoea itself is greatly benefitted and even cured in the larger percentage of instances. Relapses, which will occur in some instances, are quite as readily cleared up. It now remains to ascertain if really pyorrhoea has played such an important rôle in causing so many diverse diseases, and more extended observation will readily determine the fact.

The active immunization of hay fever according to Oppenheimer and Gottlieb may be brought about by injecting gradually increasing doses of pollen del extract to produce tolerance to the anaphylatoxin formed in the body, until a local reaction appeared at the site of the injection, keeping the doses stationary while no more reaction appeared and again increasing the dose. When the patient has become sufficiently immune, to warrant the discontinuance of the treatment, may be determined by either the complement fixation test or by the size, intensity and duration of the wheal produced by skin scarification. The latter method is probably easier in practice. The wheal produced by the initial vaccination is measured, its time of appearance and the duration noted. If the wheal is very small or does not appear the patient is sufficiently immune and may have mild or no symptoms at all. The best time to begin treatments, which should be at weekly inter-

vals, is ten weeks before the suspected attacks. If the immunity does not prevail until the following year, the attack is likely to be mild and to require but few injections.

Bishop defines narcotic drug addiction as a definite physical disease condition, presenting constant and definite physical symptoms and signs, progressing through clean-cut clinical stages of development, explainable by a mechanism of body protection against the action of narcotic toxines, accompanied by inhibition of function and auto-toxaemia, often displaying deterioration and psychoses which are not intrinsic to the disease, but are the result of toxaemia, malnutrition, anxiety, fear and suffering. The treatment resolves itself into the rational care of each individual patient, supplying the drug of body need so long as it is necessary and in such amount as are useful in maintenance of body function but at sufficiently long intervals to minimize some inhibition effect. Inhibition of function is obviated by strychnine in sufficient dosages and by relieving the patient of suffering, worry, unjust criticism, fear and anxiety. Auto-toxaemia is removed by intelligent elimination. The removal recation is lessened by the use of alkaloids of the belladonna group, preferably hyoscine or scopolamine, and this medication is to be carefully watched.

Knapp points out that the pneumonias, secondary to the apoplectic state, are the result either of the vasomotor disturbance arising from the cerebral lesions, or the cardio-vascular, which cause the apoplexy, or of the stupor which permits the invasion of the bronchi and lungs by foreign substance, and micro-organisms. To combat these various pathogenetic factors therapeutic measures, should be undertaken with four different objects in view: oral aseptics, stimulation of the circulation, stimulation of respiration and counteracting the action of gravity. Inasmuch as this complication is relatively frequent, attention should be called to the means whereby it may be obviated.

Hayden remarks that in gonorrhoeal arthritis the urethral tract and the glandular structures in anatomical relationship to it, should be carefully examined and receive proper local treatment and the urine rendered aseptic by hexamethylenamin in full doses, and still waters should be freely used, alcoholic beverages avoided and articles of diet that cause urinary concentration and irritation forbidden. In the acute stage the affected joints should be immobilized by splits, cold, wet dressings of aluminum acetate, mercury bichloride or lead subacetate, with possibly the internal administration of a salicylate. In the subacute or chronic stage massage active and passive movements, superheated dry air, the therapeutic incandescent lamp and the Oudin high-frequency electric current are useful. Of the utmost importance in this stage is the use of gonococcic vaccines or sera, autogenous if possible. The initial dosage is twenty-five million, with constantly increasing doses every three to six days. Antigonococcus serum, as vaccine, and Bier's hyperaemia may be occasionally very beneficial. Rarerly the hydroarthrosis may require aspiration under rigid aseptic precaution and in the unusual instances of suppuration, immediate arthrotomy and drainage may be imperative.

Cornwall shows that in infective pneumonia specific chemotherapy has failed and that serum or vaccine treatment has not been effective. Nature has devised a method of treating this disease to which the physician, to be rational, must be subordinate. The diet is limited to quantities of protein and food to somewhat less than minimum health rations, it is fluid easy of digestion, supplies salts needed for the body and is non-putrefactive. Specifically this consists of milk, barley water, orangeade or orange-juice, milk, sugar and water, and sodium chloride and calcium chloride. After defervescence the diet does not differ much from that generally accepted. The bowels are kept free by soap enemas, castor oil or other mild vegetable (never a saline) cathartic. Symptomatic treatment is reduced to a minimum partly as a matter of preference and partly because the method of the author prevents to some extent the occurrence of sumptoms.

The transfusion of blood often interests the internists who need the simplified procedure. Lewisohn found that two-tenths of one per cent. of sodium citrate added to human blood prevents clotting for at least forty-eight hours. If the blood eated with sodium citrate be transfused there is no retardation of the coagulation time or the blood of the entire body by reason of the sodium citrate present in the transfused blood. Finally, the sodium citrate thus introduced into the circulation is not toxic. Transfusion has become a simple matter; the blood of the donor is discharged through a canula into a glass jar containing the sodium citrate solution and stirred with a glass rod to procure admixture with the sodium citrate solution until the requisite quantity is procured. It is then poured into a glass funnel connected by tubing with a canula inserted into the recipient, the whole procedure requiring about five minutes.

Burnham, in presenting the results of a study of tuberculin in surgical tuberculosis, with especial reference to the uses of sensitized bacillary emulsions, concludes that these emulsions have apparently the same clinical action as the ordinary bacillary emulsion and that the difference in reaction is not appreciable, that it is a powerful therapeutic agent, but its contra-indication and limitations must be kept in mind and finally in surgical tuberculosis in which the benefits of climatic treatment and hospital or sanatorium care are not available, the results of tuberculin are favorable in the majority of instances.

Leszynsky advocates the use of perineural infiltration with physiological saline solution in sciatica. The amount used is from 2 to 4 ounces at a temperature of 95° to 100° F.; the interval thirty-six hours to a week before repetition; the average number required is three. It is not intended that the nerve sheath should be entered by the needle, but that infiltration of the nerve and the surrounding structures should be produced. Since sciatica, whether a symptomatic neuralgia or the result of a perineuritis is admittedly a very intractable and painful affection, often persisting for months or longer, this method of relief merits adoption inasmuch as in the majority of instances it rapidly relieves the pain, and the sufferer is soon enabled to return to his customary vocation.

Marshall and Gilchrist have re-investigated the time honored spiritus ætheris nitrosi and concluded that the contained aldehyde and paraldehyde merely give their characteristic taste and odor to the preparation and have no other action. The amount of alcohol can have little action other than a local and carminative one and in this it is probably aided by the other substances present. The diaphoretic and diuretic actions, which are obtained under favorable conditions are mainly due to its vasodilating effects, due to ethyl nitrite as the ethyl nitrite. The rapid loss of ethyl nitrite which follows the addition of water suggests, that to obtain the best effects, it is necessary to prescribe the remedy as such and to dilute it just before administration.

However, much scepticisim one may feel in regard to the beneficial effects of radium upon malignant growths it is well to encourage further study. Abbe, with the assistance of Pegram, has separated the alpha, beta and gamma rays by the use of a magnetic field. He concludes that beta rays separated from radium are demonstrated to be the efficient force, most active against living cells, that these rays are electrons, discharged from the radium atoms, being negative electrically and carried into certain types of disorderly growing cell tumors reduces them to orderly growth, and claim is made that this checking force is established.

The oil-ether colonic anaesthesia has been employed for a sufficiently long time so that definite conclusions may be reached. The latest technique includes the preparation of the patient by a mild laxative the night before the operation, and a soap and water enema followed by thorough irrigation of the colon three hours before the operation. The preliminary injection one hour before the operation consits of ⅛ grain of morphine, 1 drachm of paraldehyde, 3½ drachms of ether and the same amount of olive oil. The paraldehyde intensifies the action of the anaesthetic, giving more complete relaxation without affecting the pulse or respiration. Athletes, alcoholics and patients weighing over 160 pounds require this dose to be repeated. Twenty minutes before the operation 6 ounces of ether and 2 ounces of olive oil are given. If the patient goes to sleep, before the required amount is given, stop the administration. This method is particularly indicated if fear is in evidence, (anoci-association of Crile), an in instance of goitre, in the very obese, for bronchoscopy and gastroscopy and for all operations about the respiratory tract, head neck and chest. It is contra-indicated whenever ether is debarred, excepting in bronchitis, asthma and similar disturbances and when marked nausea has been previously experienced. As the colon bacillus is often an important agent in causing post-operative infection, this method may be prophylactic since a 50 per cent. solution of the oil-ether kills this particular micro-organism in ten minutes. Pathological conditions of the lower bowel, colitis, haemorrhoids, and fistula and marked pain in introduction of the oil-ether solution will also prevent its use. The advantage of this method in the wide margin between the dosage requisite for surgical anaethesia and that which precipitates toxaemia, and its success in the hands of Gwathmey would appear to indicate that it should be more extensively employed.

Such then has been the course of medicine during the year just closing; a progress substantial, even if gradual, and one of which the practitioner esteems himself fortunate that he may avail himself of the results. The exponents of internal medicine are basing their practice on sure foundations and are indeed contributing their share in the relief of suffering humanity.

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Fenwick says stone in the kidney of an adult very rarely produces blood without pain being experienced at some time or other in the course of the case. In nearly every instance definite and characteristic renal pain has preceded the blood, or has followed it so rapidly that a correct clue as to the site and cause of the bleeding was obtained.

Cases of tuberculosis of bones, glands, and internal organs from which there is no discharge or which do not furnish any excretion, and cases of arrested pulmonary tuberculosis, have never been proved to be infectious.

SOME ABNORMAL CARDIAC CONDUCTIVITIES.*

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Before forming views as to the many causes of irregular heart action, the intimate structure of the heart and its physiological laws should claim our attention.

So far as cardiac physiology is concerned, a very advanced step was taken by Gaskell (Gaskell, Schaefer's *Text Book of Physiology,* 1900, 11 pp. 169 *et seq.,* when he laid down his five attributes of cardiac muscle, viz., Rhythmicity, Excitability, Contractility, Conductivity, and Tonicity. And they were soon accepted as suitable bases for classifying the arrhythmias. But while these divisions have been of great practical value, we are not to believe that each form of arrhythmia is necessarily included within the hard and fast lines of any sort of classification, which must of course have its limitations. And this is especially true in the case of arrhythmias, because we sometimes find that interference with conduction, as in heart block, will alternate with rapid contractions, caused by auricular fibrillation or flutter, a single cause producing the two anomalies. In fact, all of the five attributes are at times interconnected. To take other examples, abnormal rhythmicity may depend either on increased excitability, abnormalities of contraction or of conduction. Even tonicity is etiologically related to others of the attributes, for it represents what has been called a "balanced mechanism," the tone of the organ being maintained by the nervous force of antagonistic powers, which make it particularly sensitive to any delicate stimulus. Such opposing influences maintain a normal tone.

In anomalies of conduction either some alteration has taken place in the tissues that conduct impulses between the s-a or sino-auricular node and their ultimate termination in Purkinje's fibres; or there is functional disease or some organic change in the nerve filaments along the line of the vagus.

'It is still a question at issue among physiologists whether the influence that starts the heart beat and conducts it is myogenic or neurogenic. Pflüger has shown that the human heart beats in the third week of intrauterine life, though according to His and Romberg ganglion cells are not to be found before the fifth week. Nicolai has pointed out, however, that the material which first pulsates is not muscle, but an undifferentiated substance, the "contractile protoplasm" of Köl liker. (Nicolai, *Archiv. f. Anat. u. Phys., Phys. Abtheil.,* 1910, *s.* 35 *et seq.*) On the other hand, nerve fibrils and ganglion cells have been found both in the s-a node, from which we believe the normal impulse gets its first start, and also in the a-v or auriculo-ventricular node, which at times supplants the other node in function; also in any part of the conducting tract, the last discovery being that of Engel (Engel, *Beiträge z. Path. Anat.,* 1910, *s.* 499), who traced nerve filaments as far as their connection with the Purkinje network on the inner walls of the ventricles. The fibres were found in a human heart within about an hour after death by a new method of staining of nerve tissues.

The s-a node is in the right auricle. It surrounds the upper portion of the sulcus terminalis. From this point the impulse spreads at the rate of about 1000 millimeters per second along certain muscle tracts that radi-

* Read by title at the annual meeting of the American Therapeutic Society in San Francisco, June 21, 1915.

ate from the node. These radiations extend over the entire inner surface of the right auricle, terminating in its chief veins. But it also courses to the a-v or inferior node, whence it is transmitted to the left auricle and afterwards to the right ventricle through the auriculo-ventricular bundle, known as the bundle of His, or Gaskell's bridge. It continues on to join with the Purkinje fibres. Some, however, still maintain that in addition it may originate in the coronary sinus, which is the dilated remnant of the great cardiac vein, and lies in the coronary sulcus between the left auricle and left ventricle. It is the representative of the sinus venosus of fetal life, and persists in some of the lower vertebrates as such. The coronary sinus opens into the right auricle, quite near the auriculo-ventricular node, and excitations about the orifice of the sinus will elicit responses from the ventricle much as from either the s-a or the a-v nodes. Undoubtedly, I think, there are a number of points in the interior of the right auricle which will stimulate the ventricle in a similar manner. We may therefore regard this sinus as sharing with the s-a and a-v nodes the property of exciting a current that will cause ventricular contraction. This impulse having started from the right auricle causes primarily an excitation that produces contraction first in the conus, or infundibulum, close to the interventricular groove, or in the anterior papillary muscle which lies under the conus. Then follows excitation of all the remainder of the ventricle, except that part of the conus directly below the pulmonary valve. For it is this part of the conus that is the last to be excited.

In the left ventricle the first part to be excited is the apex, and about a hundredth of a second later the neighboring parts, and finally the base. The course of the impulse bears no relation to the direction of the muscle fibres.

The auricular part of the wave occupies from four to five hundredths of a second, the ventricular less than three hundredths. (Lewis, *Lectures on the Heart,* 1915, pp. 16 *et seq.*) Probably sympathetic fibres will be found along the course of the conducting tract; some new method of preparing or staining the tissues will be found that will demonstrate them. In both the s-a and a-v nodes there have been found ganglia and nerve fibrils, some of which at least are vagal. They are embedded in an interlacing network of connective tissue and elastic fibres, intermixed with which are peculiar delicately cross-striated muscle cells.

The s-a node lies close to the roof of the right auricle, at the roots of the superior venae cavae, while the a-v, auriculo-ventricular, or Tawara's node is placed in the junctional tissues of the auricular septum. While the normal impulse originates at the s-a node, if for any reason it is intercepted or nullified, the a-v node assumes the primary role, and becomes the pace-maker of cardiac action. But if this lower node should happen to be out of commission, the ventricle will still get the impulse from some center of its own. Probably there are several. But in such a case the ventricle will not become the pace-maker for the auricle; it will not transmit its impulse in a direction the reverse of the normal.

There are also probably accelerator and inhibitory ganglia in the nodes, for in sharks and dogfish Hemmeter has found them in the sinus venosus, which is the prototype of the coronary sinus in the human species. (Satterthwaite, *Cardiovascular Diseases,* 1912, p 19.) The accelerator nerves belong to the central nerve system, the inhibitory to the sympathetic. In fact, the accelerators unite with the upper and lower branches of the vagus, forming the cardiac plexus, which covers the ascending portion and arch of the aorta. From this source the heart receives both its accelerator and inhibitory fibres. The one hastens and the other retards the action of the heart. It is possible that the ventricles are supplied with nerves through the network formed by the coronary system of vessels, which anastomose freely, contrary to the views of Hyrtl. The vagus itself controls the rate and force of contraction. For pressure on the vagus in the neck produces slower and slower cardiac contractions, until eventually they will come to a standstill. In fact, direct stimulation of the vagus, experimentally, may keep the heart action inhibited for several hours. Or the inhibition may be brought about indirectly, as by distention of the stomach or intestines by gas, when the action of the heart may be entirely stopped. In such cases, sometimes called asystole, we should naturally expect that respiration would be suspended as well, as it also depends on vagal influence. I have seen such a case, where death seemed actually to have taken place. The modus operandi of such a suspension of function has been explained by Howell (Howell, *Textbook of Physiology,* 1911, p. 579), on the theory that an afferent impulse is conveyed to the central nervous system, stimulating those cells in the medulla which give origin to the inhibitory fibres, and so by reflex influence causing the standstill. The site of this cardio-inhibitory center is unknown to us as yet.

Suspension of the heart's action may also follow very deep inspiration, due to the pressure on the filaments of the vagus by the inspiratory act. The heart is furnished with two kinds of muscle fibres, in addition to the peculiar transversely-striated fibres of the auricles and ventricles. These are the muscle fibres of the vessels and of the nodes. The latter have already been described. It is through the medium of these muscle fibres that the activities of the organ are provoked and maintained.

Of late years great progress has been made in our analysis of the structure of the heart by researches into its embryology and minute anatomy. At the same time our knowledge of its physiological qualities has been vastly increased by the use of improved graphic methods, used to record the relations in time and force of the contractions in its chambers. The polygraph is an instrument that is capable of giving tracings of the blood flow in all the four chambers of the heart, and is the best instrument available at the present time for the interpretation of cardiac anomalies. It is especially valuable for clinical work. The electrocardiograph combines the use of electricity and photography, and is essentially a laboratory machine; but it has the advantage over most polygraphic machines that it operates automatically, and registers normal and pathological conditions of auricular contractions more clearly than the polygraph. Neither of them furnishes a record that is absolutely correct in point of time. We usually judge of the time of the auricular impulse by the jugular, and in so doing the interval of time lost is normally about 1/10 second, with a further loss attributable to the mechanical operation of the instrument that is from 1/10 to 1/5 of a second. In the electrocardiogram the contraction of the ventricle is heralded by the contraction of papillary muscles, which is apt to be in normal cases 1/20 of a second in advance of the actual contraction of the ventricular walls as a whole.

In graphic tracings the strokes that represent the contractions of both auricles and ventricles are composite, being made upon the one hand of the auricular contractions which are note quite simultaneous, or of those of the ventricles, which also contract separately. Such

are the conditions one has to face in the interpretation of both polygrams and electrocardiograms.

In taking up some of the phases of abnormal conductivity, brief allusion will be made to frequency and infrequency of heart action.

So far as we know, frequency of heart action must be laid to nervous influences. Experimental irritation of the accelerator nerves or section of the vagus at its roots will increase the rate of cardiac action. In fact, abstraction of vagal influence will permit a pulse of 180. But this rate can be further increased by an interpolation of beats. Auricular fibrillation or flutter will again increase the frequency. The causes are numerous, and include organic diseases of the heart and large vessels; febrile conditions; vagal compression; organic diseases of the cerebrospinal or sympathetic systems; acute or chronic infective diseases; poisoning by drugs, such as atropin or adrenalin; abuse of tobacco, coffee or tea; reflexes from internal organs; neuroses. There are three kinds of frequent heart action: the temporary, the paroxysmal, and the permanent. They are so familiar that it is unnecessary to consider them at length. In neuroses we usually have efficient remedies in strong coffee or diffusible stimulants, while morphine may be necessary if milder remedies are inefficacious. Assuming that these neuroses may be reflex and due to gastrointestinal intoxication, the salicylates have been used with success. Other intestinal disinfectants may also be effective. If, however, the pulse rate is due to the intensity of the disease, as in febrile conditions, we should not necessarily feel that it must be reduced. A pulse of 120 to 130 does not of itself produce distress. Some years ago I had a patient who came to me with a pulse that was at times above 130. In fact, at the beginning of his treatment it averaged between 125 and 130, but it fell to an average of 111 under treatment, mainly by carbonated baths and resistance exercises. He had locomotor ataxia, luetic phthisis, mitral endocarditis and arteriosclerosis. But even with this complication of diseases he managed to attend to a fairly active business ness. Death was due to an attack of acute gastritis.

In such instances we should not resort to drugs like hellebore or digitalis merely to reduce the pulse frequency; by so doing we do not gain any useful end, and may do harm.

In emotional patients the environment is to be duly considered. Here also the Nauheim bath is applicable.

The prognosis naturally depends on the cause, as the frequency is merely a symptom, and the expectation of recovery depends on the underlying condition. In chronic cases, like the one mentioned, the prognosis is unfavorable, but temporary or paroxysmal attacks may gradually disappear. Rapidity of the pulse has in itself no direct bearing on the chances for recovery. I once saw in consultation with the late Dr. Heinemann and the family physician a patient with Graves' disease, who was suffering from a paroxysmal attack and had a pulse that could not be counted by the finger. But her family physician subsequently told me that she made a good recovery.

Infrequency of heart action may occur at any period of life, but is usually seen in the decades between twenty and forty. In the adult it is held, somewhat arbitrarily, that a pulse rate below 60 is infrequent, though according to Grob. (*Deutsch, Arch. f. Klin. Med.*, 1888, *XLII, s.* 574), the incidence is as much as one in forty. There are two main varieties, the temporary and the permanent. At the outset we should remember, however, that in apparently good health the cardiac rate may be below 40. Lewis and Prentiss (*Trans. Amer. Phys.*, 1889, *p.* 120) have published such instances, and Vigouroux (*Gaz. des Hopitaux*, 1876, *p.* 788) one of a laborer whose pulse never exceeded 20, but who had never, so far as he knew, suffered from any serious illness. Inheritance plays a part in the matter, and pregnancy as well. Among pathological causes are infections, toxemias, functional and reflex nervous disturbances, diseases of the brain and cord, and organic diseases of the heart.

An instance in this category where the pulse fell to 7½ was published by Holbertson (*Medico-Chirur. Trans., XXIV, p.* 76). There had been a fracture of the occipital bone, with pressure on the medulla, undoubtedly affecting the inhibitory ganglia or then filaments. A rate as low as 4 per minute was recorded by Day. In one of Prentiss's cases, where the pulse fell to 13, there was recovery. In a patient suffering from opium poisoning whom I attended many years ago, there was no perceptible pulse when I first saw him. He was unconscious, and there was only the faintest intimation of respiration, and at long intervals. In fact, he had been pronounced dead by a surgeon some four hours previously, and again somewhat later by a physician who had also been called in. He recovered, chiefly as a result of the energetic use of the faradic battery. In the first case of asystole referred to, I should judge that there was no heart action for at least a minute; it may have been two minutes, or perhaps more, but in such cases one is too much taken up with efforts to give relief to take account of time. The patient recovered under alcoholic hyperdermatics and artificial respiration by my method, the abdominal.

Extra-systoles are due to other than nodal impulses, and may originate in different parts of the right auricle or ventricle; they are then called ectopic impulses. Or they may be due to an irritable vagus, as in tobacco poisoning. As in the normal beat, the ventricle responds to the auricular impulse, but conversely the auricle does not respond to any ventricular excitation.

Extra auricular systoles are shown in a polygram or electrocardiogram by having shorter cycles than their fellows, as well as by other well-known signs. They are apt to be in groups. On the other hand, ventricular extra-systoles show sometimes in a polygram as large atypical beats, and this is one characteristic that differentiates them from the auricular form. There are, of course, other signs also.

Extra-systoles are due to poisoning by tobacco or chloroform, stimulation of the sympathetic, toxemias, infections, abuse of digitalis, and myocardial diseases. Undoubtedly there are also other causes. In the treatment digitalis and its congeners are indicated in physiological doses of standard preparations. Nauheim baths are also useful. Rest in bed and regulation of the gastro-intestinal system are likewise important.

Heart block is a condition where the ventricle fails to respond to nodal influences, or the response is irregular. It is often though not necessarily associated with infrequent ventricular action. There are four principal varieties:

1. Acute heart block, usually due to a misuse of drugs.

2. Partial or incomplete heart block, which is shown in two ways. There may be a gradual lengthening of the intervals between the ventricular beats, so that after a time this interval is equal to two beats of the auricle. The result is that a ventricular beat is "missed." This form of missed beat occurs at regular intervals, and can be distinguished clinically by this fact. Then there is the "dropped beat" where at irregular intervals the impulse does not come through.

3. Complete heart block occurs where no impulse is transmitted from auricle to ventricle, and in consequence the two chambers beat independently of each other.

4. The Adams-Stokes complex occurs where the loss of conductivity is associated with syncopal attacks.

Any form of heart block can be made out by taking the pulse with one hand and with the fingers of the other palpating the jugular in the supraclavicular triangle, but the kind and degree of block is better shown by the waves of a jugulo-carotid tracing, as taken by a polygraph, when the a-c interval, or difference in time between the auricular contraction and the carotid pulse will show the lack of conductivity in a precise manner. In all such instances, if we desire to eliminate the vagus as a cause of the block, atropin should be given in 1/60 grain doses, when as a rule the ventricular rate will rise to or towards the auricular. This test should always be made when the ventricular contractions are under 40. The differentiation has an important bearing on the treatment.

Among the most frequent causes of deficient conductivity are syphilis, fibrosis and neoplasms of the heart, diseases at the base of the brain or in the peripheral branches of the vagus, poisoning by aconitin, epinephrin, muscarin, physostigmin and digitalin, as determined by experimentation, also asphyxia.

In physiological infrequency of the heart action we can draw no conclusions as to the expectation of life, for the number of such instances has been limited. But we have no reason to give an adverse prognosis in them, or in the incomplete forms which are probably more common than we have suspected. In Adams-Stokes disease, however, and where the block is permanent, the prognosis is more unfavorable. At the best, such patients seldom live more than a few years, though one of my Adams-Stokes cases survived the attack, lived upwards of a dozen years, and most of the time led a tolerably active outdoor life.

Infrequency of heart action when physiological, needs no treatment. When pathological, the underlying disease should claim our chief attention. If the vagus is suspected of being at the root of the difficulty, atropin should be given to determine it. Dock has used the nitrate of strychnin in 1/60 grain doses with benefit in Stokes-Adams disease. My patient already referred to took strychnin sulphate from time to time, the dose varying from 1/60 to 1/40 grain three times a day. But he felt most benefit from the static machine and high frequency current. He also took nitroglycerin. If there is high pressure, this is to be given in doses of from 1/200 to 1/100 grain three times a day. Though digitalis and its congeners are contraindicated in complete heart block, I have used the former advantageously in Stokes-Adams disease, if given with caution. Camphor monobromate, assafetida, valerian, and Hoffmann's anodyne, together with resistance exercises and the Nauheim baths, are of benefit in the milder cases. Josué and Godlewski (*Soc. Med. des Hop.*, May, 1913) claim that moderate exercise, even the climbing of stairs, can be made to raise the ventricular rate without risk to the patient, if the exercises are gradual. At any rate, we should not attempt to accelerate the pulse by drugs; experience has amply shown that such treatment has bad results. In all instances where there is a possibility that syphilis is the cause of the block, a thorough course of anti-luetic treatment should be given.

There is a form of ventricular contraction called hemi-systole, where there is but a single ventricular contraction following two auricular, while alternating with the response of one ventricle there is a response of both. The failure to respond is usually on the part of the right ventricle.

Auricular fibrillation and flutter, and ventricular fibrillation represent various degrees of rapid contraction in the heart chambers. Of these we know little as yet, except as to articular fibrillation and flutter. The difference between these two is one of degree, not of character, and the separation is artificial. All rapid auricular contractions up to 200 per minute are spoken of as fibrillation and all above that number as flutter. In these instances the ventricle beats less frequently than the auricle. There is therefore some defect in conductivity, or, in other words, incomplete block. Fibrillation and flutter may be temporary or permanent. In fibrillation the auricle is in diastole, and a series of tremors pass over it. These wavelets or tremors are shown in the polygram, especially if the wave is magnified. They are best shown, however, by a kymograph running at high speed; the slowed instrument will not show them in the polygram.

Auricular flutter may be physiological. I have seen it in the jugular tracing of a boy of ten who had the juvenile type of arrhythmia. It may be due at times to neurotic conditions. In pathological cases it is usually caused by rheumatism. Perpetual arrhythmia due to auricular fibrillation is the new name given to the former nodal rhythm of Mackenzie, or the permanently irregular pulse of Hering. While the rate in fibrillation may rise to 200 per minute, in flutter it may reach 500 and more.

In the vast majority of instances where the arterial tracing shows that no two successive heart beats have the same length, a diagnosis of auricular fibrillation may be made. Fibrillation is most clearly shown in an electrocardiogram.

Both fibrillation and flutter are best treated by the use of glonoin, digitalin, and strophanthin. I give these in combination, in small doses of 1/100 grain each, repeating at intervals of 4 to 6 hours. By the use of this combination the effect of the digitalis is improved by the more rapid action of the strophanthus and the still more rapid glonoin. By using the mixed glucosides digitalin and strophanthin, no gastric disturbance is produced, and the treatment above outlined can be kept up indefinitely, as is often necessary in the pathological cases. Clinically we know that the permanently irregular pulse must be kept continually under control by digitalis or its congeners. We should have more success with these patients if we could make them understand that their life depends on the continuous use of these drugs, but they tire of constant drugging, and we can hardly wonder at it.

Ventricular asystole or standstill sometimes takes place, as has already been said. Instances of it are rare, but they have been reported from time to time. Lewis, in his recent book (*loc. cit.*), has told of one patient in his practice who had ventricular intermissions of from three to eight seconds, and at the end of the first five seconds unconsciousness, while the auricles continued to beat. Later there was heart block. This patient died, and at the autopsy a sort of naevoid tissue was found in the a-v node. An engorgement of these vessels was thought to have produced the standstill. Laslett (*Quarterly Jour. of Med.*, 1908-9, 11 *p.* 347) has reported a case where there was an intermission in the heart's action of from four to eight seconds. It was due to vagal influence.

My case referred to was also due to vagal influence. With the asystole, which lasted a long time, though I

can only guess at the precise period, there was suspended respiration and unconsciousness. But recovery took place, under whiskey and artificial respiration as already said.

In some domestic animals there may be suspension of heart action of from one to two minutes, and then death ensues. But in some of the cold-blooded species the heart may be kept inhibited for hours by stimulation of the vagus. Mills kept the heart of a terrapin in this condition for four hours (Howell, *loc. cit.*) without causing death.

It is well known that syncope is common in all forms of heart block. In the 2-1 variety the cause may be a sudden increase in the degree of block; in complete dissociation the stoppage may be due to exhaustion of nerve energy. Other causes alleged are cerebral anemia or simply slowing down to a 18-20 pulse rate, which appears usually to be inconsistent with life if the rate is prolonged for any considerable length of time. Or there may be exhaustion of ventricular energy, due to such rapidity of heart action that the nervous system breaks down under the strain. There is room for abundant theorizing on these points.

But Lewis has proved that ventricular fibrillation can be caused, in the dog at least, by tying a coronary twig, by irritation of a papillary muscle, or the central surface of the right ventricle, or its lower angle. Also, experiments on a cat have shown that death from chloroform is attended by ventricular fibrillation. In all of these instances, the fibrillation passed over into delirium cordis. From analogy, therefore, we may believe that delirium cordis in the human being is produced in a similar way. Lewis goes beyond this, and holds that the sudden deaths in convalescence commonly attributed to a clot in the pulmonary or plugging of a coronary are in reality due to ventricular fibrillation. I have held that the determining cause is apt to be degeneration of the myocardial tissue. But the two theories are not inconsistent with each other. We are still very lacking in facts about ventricular fibrillation. Up to the date of writing this article, I know of only one instance of it that has been reported.[1] It was Hoffmann's, and the patient recovered. In treating delirium cordis I fancy we are face to face with it, and yet I feel sure it sometimes yields to treatment, so I do not agree with Lewis's pessimistic view that it is a necessary precursor of death.

In these instances I use nitroglycerin in repeated doses, without much regard to the quantity, and here been successful. I have had no ill results from the dosage. Sometimes I give it internally in conjunction with amyl nitrite and menthol, in the following mixture, the formula of which is from a London hospital:

℞ Nitroglycerin .....gr. 1/100
Amyl Nitrite .....gr. 1/4
Menthol .....gr. 1/50
Oleoresin of Capsicum.....gr. 1/100

This mixture is placed in capsules hermetically sealed. I sometimes give them at intervals of a minute or two, with or without nitroglycerin additionally, until an impression has been made on the pulse. I have never known them to do harm. But they should be given under the eye of the physician, and promptly, with regard to the result, not the strength or frequency of the dosage.

But neither digitalis nor strophanthus nor spartein nor any heart drug that is slow in action should be given in an atack of delirium cordis. They act too slowly to be efficient, and if pushed too actively will produce heart block.[2] I fear that digitalis is too frequently given in such cases, without a proper knowledge of its physiological action. Adrenalin I also place among the dangerous remedies not to be used in such emergencies. I have already called attention to the alarming rise in blood pressure which it produces when injected intravenously, and I have seen a death which I attributed to its use. Forchheimer, our late member, says (*Ther. of Int. Dis., pp.* 100-101) that repeated administration of it to animals causes necrosis of the arteries; and Kauert (*Deutsch. Arch. f. Klin. Med.,* 1910, *s.* 387) that it is contraindicated in organic heart diseases, nephritis and arteriosclerosis, if used intra venously. If used subcutaneously it is comparatively free from danger, but is often inert. As a substitute for strychnin I have used for many years the dried suprarenal gland, in 2½ grain doses, with fairly good results.

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[1] Since writing the above I have reported a case in International Clinics, Vol. III, Series 25.

[2] I except digipuratum given intravenously.

MORAL INSANITY.*

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Persons who are guilty of the violations of our laws and ethical standards of conduct have been divided into three classes.

First, those who commit such prohibited acts as a means of self-preservation for themselves or those dependant upon them.

Second, those guilty of like offenses who have grown up surrounded by immoral influences, which they have been taught to believe are the normal ethical standards, not only of their own social level, but for society in general as well.

Third, a class of persons, no matter how carefully trained and surrounded by moral and ethical standards, who it is claimed will repeatedly commit prohibited acts, and thus not only destroy their own prospects in life, but also bring shame and ruin on those associated with them. To this class has been given the titles of moral, instinctive, affective and impulsive insanity, and more recently by Barr of ammoral imbecility.

Of this class, Martin W. Barr, in his work on mental defectives, says:

"In ammoral imbecility there is a partial or absolute absence of moral sense as complete as the absence of sight in the blind. This may not necessarily be associated with physical or mental defect, but constitutes a defect of its own.

"In the moral imbecile the degeneration of the pschic forces is the peculiar and distinctive feature causing a perversion or complete absence of the moral sense.

"In the low grade we find the cruel or bestial type—a sensual delighting in evil propensities. In the middle grade, the absence o faltruism and constant infringement of the rights of others appears, simply from the love of mischief or the excitement of accomplishment. In the high grade there is a refinement of evil, the mental powers subordinated wholly to a perverted moral sense, exhibit often a craftiness and skill truly satanic, while the not infrequent association of great physical beauty and bodily vigor, together with the entire absence of physical stigmata, render the recognition of this type except by experts impossible."

Henry Maudsley, in his Responsibility in Mental Disease, says of this class:

"There are in reality many persons who, without actually being imbecile or insane, are of a lower moral responsibility than the average of mankind; they have been taught the same lessons as the rest of mankind, and have a full theoretical knowledge of them, but they have not really assimilated them. They choose the gratification of a present indulgence, in spite

*Read at the 1915 meeting of the American Association of Medical Jurisprudence.

of the chance of certainty of future punishment and suffering, is often the proof of a natural affinity for evil, but a deficient understanding and a feeble will. The most sober and experienced prison officials are driven, sooner or later, to a conviction of the hopelessness of reforming habitual criminals. The symptoms are mainly exhibited in a perversion of those mental faculties which are usually called the active moral powers. He has no capacity for true moral feeling; all his impulses and desires to which he yields without check are egotistics; his conduct appears to be governed by immoral motives. The intelligence is often acute enough; being not affected otherwise than in being tainted. They often display an extraordinary ingenuity in explaining, excusing or justifying their behavior, exaggerating this, ignoring that, and so coloring the whole as to make themselves appear the victims of misrepresentation and persecution. He is incapable of following any regular pursuit in life, of recognizing the ordinary rules of prudence or self interest, or of appreciating the injury to himself which his conduct is."

A very recent writer, Charles W. Burr, says of them: "The high grade imbecile uses his education for evil purposes, the more his learning, the greater menace he is."

These extracts are sufficient to establish the fact that this form of mental disease has been recognized and described by men whose education and chances of observation entitle their opinions to be received with weight upon this subject, and to sum up then this form of mental disease can be defined as a loss of power to control impulses and a want of knowledge as to the nature and consequences of the acts.

The law of the State of New York has never recognized this form of mental disease as a defense for crime, for in Sec. 23, N. Y. Penal Code, it provides:

"That a morbid propensity to commit prohibited acts, existing in the mind of a person, who it is not shown to have been incapable of knowing the wrongfulness of such acts, forms no defense to a prosecution therefor."

Judicial decisions have always upheld this rule of law, for we find that:

"A criminal act can not be excused upon the theory of irresistible impulse, where the offender knew what he was doing and had the ability to discover his legal and moral duty in respect to it" (People vs. Coleman, 1 N. Y. Crim. R. 1); or "if he had sufficient capacity to know the legal and moral character of the act he was doing, the fact that he alleges that he had not control of his will in respect to it, but that his will was controlled by irresistible impulse is no defense" (People vs. Walworth, 4 N. Y. Crim. R. 355); or "if there is a form of insanity in which the faculties are so disordered and deranged, that a man, though he perceives the moral qualities of his acts, is unable to control them, and is urged by some mysterious pressure to the commission of acts the consequences of which he anticipates but can not avoid. Whatever medical or scientific authority there may be for this view, it has not been accepted by the Courts of Law" (Flannagan vs. People, 52 N. Y. 469).

This theory of law seems to rest on a sound public policy, that crime requires punishment, and though it may work injustice in a few cases, it is evident that if we admitted moral insanity as a defense for crime all the offender would have to do would be to claim an irresistible impulse to commit the prohibited acts, to escape the consequences and our whole system of dealing with crime would be rendered abortive.

That such a class of persons as the moral insane existed seemed to be established by its recognition by both law and medicine, and the former has collected a vast amount of evidence to support this contention, and of a nature which seemed to be beyond dispute; but the difficulty in dealing with this class of cases lies in the fact that there is no dividing line between sanity and insanity, but the two pass into each other by imperceptible gradations. Both mental conditions show the same elements, but that of the insane exhibit them in an exaggerated diminished or abnormal groupings, and therefore they exhibit the same ideas, errors, passions and motives as due the sane. The law for practical purposes has had to draw a line between the two, which is not the question whether the person is sane or insane, but whether he is responsible, that is, knows the nature, quality and consequences of his acts and the difference between right and wrong. Since this rule was formulated by Mr. Justice Hale, of England, it has been continuously attacked, but no one has yet suggested a better substitute. The situation, then, of trying to apply the rule of law to these persons whom it is admitted seem to know the nature and consequences of their acts and yet are unable to control the impulse to commit them has formed the basis of a dispute between law and medicine for nearly a century, and without reaching any satisfactory result.

Medicine, however, though it holds that such persons should not be punished as criminals, does hold that such persons are a menace to society and require custodial care. This is well stated by Barr, who says "the recognition of the moral imbecile, and the absolute necessity of a life-long guardianship, protection against temptation, and all the horrors of criminal procedure of which he must be but the innocent victim, were long and strenuously insisted by Dr. Kerlin."

The two results thus far obtained have been that some of the judicial officers have modified the punishment in such persons, and the passage and enforcement of such laws as the habitual criminal act of this state, neither of which is satisfactory, as the former does not protect society, and the latter is not an ideal way of treating the mentally deficient.

The existence of the morally insane or habitual criminal has been questioned by two groups of persons. One is of recent origin and consists of certain prison reformers, whose claim seems principally to rest on the assertion that the theories of Lombroso are all wrong; but it is not easy to understand why Lombroso should be chosen as the special object for their attack, when he did nothing more than many other writers on the same subject; nor do they offer any special grounds for their objection. Their theory seems to be but a part of the tremendous upheaval against all the established ideals of human society which has marked the end of the nineteenth century. Authority and discipline are set at naught. The aim is to be thought to be progressive and the established standards are to be destroyed regardless of consequences.

This change is in part due to the change in our educational methods. The child is no longer taught by stern discipline to obey, to think, and to accomplish the task set before him, and the result of this change is as stated by Dr. Charles W. Burr: "We have quite enough people who can read but not think." This first group who deny the existence of the moral insane seem to be dominated in part by the change which this upheaval has made in our religious beliefs. The old stern creeds which taught that we were born in a state of sin and must work out our salvation by prayer and self-denial have with many given place to the self-styled new ones which are in reality composed of fragments of old and often discarded creeds, but in all these new creeds we find the comfortable belief that there is no such thing as sin or disease, but that the universe is composed of a universal principle of love of which each human being is a part.

The second group is composed of persons who are still dominated by medieval philosophy, which holds that every person is born with an immortal soul, which is quite distinct from the physical body, and which bestows upon us a knowledge of the difference between right and wrong. Maudsley says of this group:

"The body was looked upon as vile and despicable, the temple of Satan, the house of fleshy lusts. It was the earthly prison of the spirit whose pure immortal longings were to get free from it. Feeling that they themselves had a consciousness of right and wrong, and a power of will to do the right and forbear the wrong, they never doubted that the madman had the like."

The adherents, then, of either school can claim that according to their belief there can be no such thing as moral insanity, and that by proper training any criminal can be reformed. That this is true with the first two classes of criminals can be admitted, but we have yet to learn of any substantial results with the moral insane.

To the scientist, however, the mind is not a mysterious and intangible dream of philosophy, a something quite distinct from the body, but simply the product of the function of the brain. What life or the soul is we do not know, and never will, for man's knowledge is limited to the sphere created by his senses, or as stated by Herbert Spencer, "the mind was created finite and can not grasp the infinite." That the mind is so formed is shown by the effect of want of development of injuries to the brain, of diseases of the brain, by want of development or disease of the organs of special sense in early life, by the action of certain drugs and poisons produced within the body, and by the inheritance of ancestral mental traits.

It is claimed by a certain school of philosophers that though this be true, that as our knowledge of the world is only through these impressions on our brain from our senses, that we have no evidence that matter exists; but when we consider the fact that the same object not only always produces the same impression on us and on others, and that some have done so for countless ages, it is undeniable evidence that the thing exists. This theory, however, does emphasize the fact that our knowledge of the world depends on the integrity of our senses and development of our brains.

"Man is not like some of the lower animals, born with the capacity of at once putting into play his mental functions; on the contrary, a long and patient education is necessary" (Maudsley).

The human mind is formed by impressions received by the highest nerve centers, which are those found on the surface of the brain. These impressions have been received by the lower centers of the spinal cord and base of the brain, from our special senses, internal organs, and other parts of the body, and are then transmitted upward. In early life, before the development of the cortical centers and their inhibitory control over the lower centers, such impressions are at once reflected outward as involuntary or reflex acts. Later in life such reflex acts are prevented by this inhibitory control, unless the impression be very marked, when it may cause so much disturbance as to overcome this inhibitory control and the reflex act occurs.

The impressions which thus pass up to the cortex of the brain are registered in special portions which are set apart to receive the impressions from the organ over which that center presides. It may be true that impressions so registered, though they may never again raise in the field of the conscious mind, but impressions so registered vary in intensity with the vigor of the producing cause, whether attention was directed toward the producing cause, and the relative degree of development and integrity of the centers of the brain and the organs which transmitted them. Impressions thus produced in early life are the most lasting, while our power to register new ones gradually lessens in advanced life.

It is evident that abnormal states of the brain centers or the organs from which these impressions are received may render such impressions faint, incomplete or wanting all together. As a rule each brain shows a special power to register certain kinds of impressions and a want of power to do so with others. This special power is not only inherited, but shows a special power to development through education. This power to register impressions forms the faculty of perception. In the abnormal mental state which forms the condition which is described as moral insanity, this difference in the power of perception shows greater variations than in the normal mind, and thus impressions may wanting, faint, distorted or unnaturally acute.

The various impressions produced by an object become in time associated and form a memory picture or concept of that object. When such a concept group has once been formed, it is only necessary to recall one of the members of the group of which it is composed to bring the whole into the field of consciousness. Besides these primary groups, secondary ones are formed by some of its component elements being members of other concept groups, by the fact that we can not think of any quality without recalling its opposite, and by the fact that certain concepts become associated through use together. This faculty of recalling concepts to consciousness forms what is knows as memory. Memory forms the basis of all our intellectual life, and it is upon the number and reliability of our concepts that the higher functions of the mind depend. In the morally insane type we find, as in other forms of imbecility, the concept groups show the same, but a much wider variation than is found in the normal mind, and is the same as the variations found in the component elements of the concepts. Thus they often show unusual powers of recalling such things as names and dates, and at the same time they can recall hardly anything else.

That the higher mental faculties must be defective and distorted, if the elements of which they are composed are deranged, needs no argument, and as has been said, we find these changes most marked or confined to some sphere of mental life, and as we commonly find moral defects associated with other mental abnormalities, so there is nothing to contradict our finding them as with others existing alone.

The power to recognize the source which produces each concept is known as reason, and the power to arrange our concepts so as to accomplish some definite end as judgment. This latter faculty is accomplished by our power to select the concept which we wish to use, and suppressing all others from the field of consciousness. This devides the mind into the conscious and subconscious fields. It is impossible for two trains of concepts to occupy the conscious field at the same time. The more often a train of thought is called into the conscious field, the easier it is for us to do so, and it may thus become so easily excited as to force itself on consciouness, forming an automatic mental condition. As every concept group has its motor expression, such automatic mental states, may result in reflex acts, similar but more complex, than those occurring in the lower centers. The more often we suppress a train of thoughts and reflex acts, the easier it is for us to do so, and the more often we yield to them the less our power to control them. This power to select and regulate our concepts is known as will or attention. Very marked concepts may, however, overcome the power of attention, force themselves on the conscious field, destroying self-control and judgment, and cause the person for a

time to act in a violent, automatic and reflex manner. This condition forms an emotion.

It is then in these higher psychic powers that the marked changes are often found in the cases which are described as morally insane. These people, as their minds are fixed upon certain trains of thought, often appear to have strong wills, but who are in reality dominated by certain of such trains of thought forming obsessions. Many reformers belong to this class. Their imperfect concepts also prevent them from having a real knowledge of the nature of their acts, and also being unable to reason.

Maudsley states that "such persons are apt to seize on and pursue the by-paths of thought which have been overlooked by more stable intellects, to discover unthought of relations, novel ways of looking at things, to display aesthetic feeling, artistic talent, and fanaticism." Lombroso also calls attention to the "complete absence of moral sense and sympathy is frequently found among men of genius." The acts of the moral insane, then, are often automatic or reflex, and in response to the fundamental impulses of our nature, which are the strongest which we have to control. In primitive man their exercise would be normal, but society has been forced to teach us to restrain them.

Genius differs from talent in that the latter foresees the end and plans the steps to attain it, while the former is forced by impulses which he does not understand to ends which he does not forsee. Among poets and artists criminality is unfortunately well known, as many of them are dominated by passion, and they are not protected by logical criticism and judgment found in scientific minds.

The mind of the moral insane, then, from its weakness of will and intense egotism from a want of real knowledge of the real nature of their acts, approaches closely to the untrained mind of the child, and "what terrific criminals would children be if they had strong passions, muscular strength, and sufficient intelligence" (Lombroso). In spite of the doctrines of the religious cults mentioned, that there is no such thing as heredity, there is no reason offered to doubt that we do inherit the mental and physical characters of our progenitors, and the seeming mysteries of such inheritance has been cleared away by the labors of Mendal. Each ovum, then, contains a distinct personality, and though by education we can influence the growth of the mind, the power of education is limited by the individual capacity to receive it. Crime is known to be often hereditary, in spite of the surroundings which have influenced the individual.

The natural impulses manifest themselves early in life and require systematic restraint to be kept within ethical bounds. In the moral insane the condition is often manifested early in life before the child is old enough to know what vice is, by an utter absence of all moral feeling.

It is only necessary to study the histories of the five thousand descendants of John Ishmal, or the twelve hundred descendants of the Juke amour to realize the truth of the hereditary claim for moral insanity. In one hundred gangsters sent to the Kings County Hospital under the Boylan Law, to be cured of drug habits, 87 per cent. were typical cases of moral insanity, and Benoit tests showed an average intelligence of fourteen years of age. That these persons frequently show physical stigmata due to a reversion to the primitive or animal type, seemed to be well established, but this has also recently been denied. It is only necessary here to call attention to one well known stigmata, that is the pointed and projecting ear which in classical times was bestowed on the satyr and in medieval times on the devil, to realize that the characters of persons with such ears has been recognized for ages. The proof of the hereditary nature of the mental and physical defects of the class under discussion is so strong as to cause a recent school of sociology to claim that "it is rather a good thing to have a criminal ancestry, because a criminal is a strong, good man, trying to break the fetters of wicked society" (Burr).

The last question for our consideration is the real character of the ethical standards which the defective minds which form the class known as the morally insane are to understand.

The general belief of Christian lands seems to be that they are of Divine origin and based upon the ten commandments given to Moses upon the tables of the law; but beyond the identity of the Divine power, we find nothing in them which were not already to be found in creeds which were centuries old, even in times of Moses; and it must be remembered that Moses, previous to his receiving these tables, had grown up and been educated in Egypt and must have known of the fifty-seven questions contained in the Book of the Dead to be asked of the Kar by the God Osiris. In reality our ethical standards are the product of evolution. Primitive man recognized no law, but that of force. Self-preservation, however, soon forced the members of the same family or tribe to respect the rights and property of other members of the same community, so that the same act if committed against the members of another tribe was right, while if done to the members of his own tribe was wrong. This idea has gradually been extended to nations, and finally to all mankind. During this gradual evolution acts which at one time were considered ethical, became no longer to be considered so; thus in ancient times polygamy and concubines were considered as lawful, and slavery, dueling, gambling and excessive drinking have only recently begun to be so considered. The Spartan boy was taught to lie and steal. Various cruelties once openly practiced upon men and animals are now no longer tolerated in civilized countries. The whole development of our standards of ethics, then, has been one in which the ego has been diminished by forcing the individual to respect the rights of others by forcing him to use his will to control his impulses. It is evident, then, that the type of minds which form the subject of this paper, from the defects already mentioned, can never be molded in such a way as to understand and obey them, and must for the protection of society be placed in custodial care.

29 So. Portland Ave.

Newman says hematuria without pain is the prominent feature in the early stages of tumor and in the later suffering is complained of only when the ureter becomes blocked, or when the tumor becomes so large as to cause pain from pressure on the lumbar plexus. The bleeding is from one ureter—at first seldom, small in quantity, spontaneous, afterwards frequent and severe, ultimately continuous and alarming. There is in the later stages a swelling, bulging posteriorly, and covered in front by the colon; the swelling retains the usual form of the kidney, extends from under the ribs, is dull behind and resonant in front, and there is no fluctuation. There is no shadow with *x*-rays, and there are no tubercle bacilli in the urine, and the temperature is normal.

BURNS: MINOR SURGERY AND OFFICE SURGERY.

From the Surgical Clinic of
WILLIAM FRANCIS CAMPBELL, A.B., M.D., F.A.C.S.
Brooklyn, New York.

Burns

History: Patient female, five years old, enters hospital because of a burn of the abdomen and thighs. The mother states that a few hours ago some boiling water was accidentally overturned on the child which resulted in scalding the abdomen and thighs.

Comment: The treatment of burns comprises local, general, and symptomatic care. The general treatment should be directed at once toward combating shock; and for this purpose there is no single drug so valuable as opium. Immediate small doses of morphine administered hypodermatically relieve the pain, steady the nervous system, and limit or prevent vital depression. We have already given this patient gr. 1/16 of Morphine and the effects have been most satisfactory. Next in importance is a supply of fluids to compensate for the great loss which takes place in extensive burned surfaces, and to aid in the elimination of the toxins. This is best accomplished by saline injections per rectum, small amounts being given at frequent intervals.

Local Treatment: The local treatment of burns demands the same scrupulous care as is given to other wounds, and the further the local treatment of burns is removed from the accepted principles of wound treatment the less satisfactory will be the results.

We shall anesthetize this patient because it is impossible to secure thorough cleansing of the burn without an anaesthetic. The anaesthetic helps to limit shock and permits the operator to thoroughly cleanse the wound.

The blisters are opened and the raised epithelium removed. There is no valid reason to leave this epithelium since it is dead, and if left will only contribute to the formation of surface sloughs.

The wounded surface is cleansed of all devitalized tissue and disinfected with boric acid solution.

Dressings: In the choice of a dressing it is at once obvious that any application which retains the discharges and thus promotes septic absorption is irrational and dangerous; hence, *ointments and powders have no place in the treatment of burns.* It is time they were abandoned and rational measures adopted.

The ideal dressing for a burn is one which allays the pain, prevents sepsis, and promotes healing; these characteristics are admirably exhibited in *picric acid.* Make a solution containing picric acid one and a half drams, alcohol three ounces, and distilled water forty ounces. Moisten gauze compresses with the solution, apply to the injured surface and retain them with bandages lightly applied. In placing the dressings considerable care must be taken to overlap the edges of the wounded surface so that ample protection is assured against marginal infection which so frequently occurs.

In *extensive burns* the whole body may be immersed in a bath of boric acid solution which must be kept at body temperature.

The *prevention of deforming cicatrices* is no minor part of the treatment. Even after the patient is well on the road to recovery he is still menaced by the possibility of contracting cicatrices, which not only deform, but compromise function. However, if the surgeon is vigilant many deplorable results may be prevented by the early application of adequate prophylactic measures. The following suggestions are important:

A. In the arm or leg the use of splints is indicated to hold the limb in the opposite direction to which it is likely to be drawn by a contracting cicatrix.

B. In burns of adjacent fingers the dressing should embrace each finger separately and the fingers be held in extension by a splint to prevent cicatricial syndactyly and deforming flexures.

C. Skin-grafting is the best means of rapidly healing a granulating surface and of preventing cicatricial contraction. This valuable adjuvant is too frequently used as a last resort to cover in granulating surfaces which refuse to heal, and after a cicatricial base is already established.

Skin-grafting should be used early:—just as soon as a healthy granulating surface is established. Small Thiersch grafts should be implanted at several sittings. Do not attempt too much at one operation. Several short ether narcoses are less harmful than a single long one, and the small graft frequently applied is usually the shortest route to satisfactory results.

Even with the greatest care burns in certain regions are followed by cicatricial deformities. This is notably true in burns about the face and neck.

Ectropion often follows burns of the eyelid. Burns of the lip, the chin, and the neck draw the lip downward, depress the chin and fix it on the sternum, or cause various deviations of the neck to one side. These ultimate cicatricial deformities must be treated on the general principles which govern plastic operations:—excision of the cicatricial bands, followed by grafting, or transplantation of skin flaps. This usually ameliorates the deplorable deformities.

It must however be remembered, that extensive skin plastics should be attempted only after granulations areas are covered by scar tissue.

Minor Surgery and Office Surgery.

The term "minor" surgery is a very indefinite one. There is no surgery that is minor in its significance; and a so called minor surgical procedure may become major in one second if the wrong structure is unexpectedly cut.

The simple dressing of a wound may even become a major surgical procedure. We recall the dressing of a psoas abscess which had burrowed its way under Poupart's ligament, and presented in the thigh over the great vessels. The abscess had been opened and drainage provided, the progress of the case was satisfactory. As the drainage tube was withdrawn blood began to pour out of the wound and in such quantities and so persistently that the patient was soon pulseless. Before the dressing was finished the vessel had to be ligated and the patient transfused. No surgical procedure is of minor importance. They are all important, and they are all of major importance to the patient and to the doctor's reputation.

But there is unquestionably a large amount of minor surgical operations which may be done at the physician's office and by the family practitioner. It is not necessary that every surgical condition however simple should be rushed to a hospital. There are many surgical conditions which can and ought to be treated by the family physician—the majority of fractures, the majority of dislocations, abscesses, fistulae, hemorrhoids, superficial wounds, superficial neoplasms and cysts. These are all within the scope of the family physician. Some of them may be done in the office, some of them most emphatically should not be done in the office, and it requires some discernment, with a substrata of common sense, and a top dressing of common honesty to know which is office surgery and which is not; to dif-

ferentiate the obviously simple from the potentially difficult.

An incised wound of the wrist is obviously simple, the incised skin can be sutured at the office; and primary union is often the convincing witness of a faultless technique; but alas! the healed wound of the skin sometimes covers a multitude of sins—the sins of severed tendons and severed nerves of which the functionless fingers are the helpless witnesses. This is just one of the end results which is seen quite often and of which the man who does the office surgery is not always aware.

There are many surgical procedures which can be done at the office that good, sound judgment should deter us from doing.

Rule I. A good rule which should be emphasized is—*do no surgical operation at the office however simple that requires a general anaesthetic.* This rule is for the protection of the doctor's reputation in the community in which he practices. For whatever the general anaesthetic selected, however carefully given, there is no guarantee against fatality, and strange to say many of the fatalities have occurred during the simplest surgical operations.

A patient may die in a hopstial, or even in his own home from anaesthesia, but if he dies in a physician's office it will be a long time before the community will restore the doctor to its confidence. Minor surgery that requires a general anaesthetic should be done at the home of the patient, not the physician's office.

Rule II. Do not attempt to do surgery at the office that requires an exact aseptic technique. This technique cannot be carried out with one pair of hands. It requires at least two, and three pairs of hands are better.

The doctor who sutured the incised wound of the wrist at his office did all he was justified in doing at the office—the office is no place to repair severed tendons and nerves, this kind of surgery requires the most exquisite technique. The criticism is that the doctor deceived himself and his patient in making it appear that in suturing the skin wound he had fulfilled his obligations.

Fortunate the man and especially the doctor who realizes his own limitations.

It takes a certain amount of moral courage and righteous stamina to frankly admit, especially in a professional way, that there are certain cases we are not competent to treat; or to admit that our office equipment is inadequate to all the demands of medicine and surgery; and yet intelligent people will want to tie up to the doctor who is level headed enough to know the limitations of one pair of hands, and the circumscribed field of local anaesthesia as he applies these to his cases of office surgery.

A doctor may do any emergency surgery in his office, but emergency surgery is not distinctively office surgery. Emergency surgery may be done in the kitchen or wherever need calls; the principle is to apply remedial measures as quickly as possible to save human life, irrespective of time or place.

But office surgery as a rule is not emergency surgery. It is ambulatory surgery; the patients come to the office because they are well enough to walk, and this leads to the suggestion of another rule.

Rule III. Don't do any surgery to a patient who walks into your office that will prevent him from walking out. To do this is not only bad psychology, but it isn't fair play to the patient. Any surgery which is to be temporarily crippling or debilitating should be done at home. The exercise of a fair discrimination in this matter will in the long run be duly rewarded.

In the reciprocal relation of doctor to the community, the central figure is not the doctor or the surgeon, the central figure is the patient; his interests are paramount; and the best doctor is the doctor who plays the patient's game. And again, the central place is not the doctor's office nor the hospital, but the patient's home, and the doctor who is doing what he honestly can to conserve these interests is discharging his highest obligations to his profession and to the community which he serves.

There is one safe rule to be taken as a guide in the practice of medicine and surgery, and that is the "golden rule."

We never fail to find this rule aligned on the side of truth. Operate on other people the way you would like to be operated on yourself. Give the care and skill and conscientious effort to your patients that you would want given to a member of your own family. Do the kind of office surgery on the kind of cases that you would be willing to have done on yourself or a member of your family.

With this rule as a guiding principle there is little fear that our profession will greatly err.

394 Clinton Avenue.

PARACUTIC DEAFNESS.

HAROLD HAYS, M.D., F.A.C.S.
New York.

The term paracutic deafness indicates that the deaf person is able to hear better in a noisy place than in a quiet room. One is frequently told by deaf persons that they can hear perfectly well in a subway or elevated train, or while driving an automobile. This seems to be a paradox of nature, which is very difficult to explain.

In the majority of cases of paracutic deafness one finds that the ear drum has lost its tension, i. e., is relaxed, although such a condition is not present in all cases. The tension of the ear drum can readily be ascertained by applying the pneumo-massage apparatus to an electric ear speculum. The excursions of the drum are very readily seen through such an instrument, and by repeated experience the otologist can determine just how much of the trouble is caused by this laxity.

In ordinary examinations of the drum, in certain cases of paracutic deafness one sees a membrane which apparently is very much thickened and retracted but careful inspection indicates that certain parts of the drum, either the part just below the insertion of the malleus or Schrapnel's membrane, is relaxed. Even when such a small portion of the drum is relaxed paracutic deafness may result.

The only way that one can explain the various physical phenomena which occur in the middle ear cavity is by applying the ordinary rules of physics and then fitting these rules to individual cases. However, much one may do this, he is frequently confronted with a physical condition which ought to result in certain definite symptoms and yet these symptoms do not occur. For example, I have seen all sorts of conditions of ear drums, such as large perforations, decided retraction and thickening, etc., which should have resulted in deafness and did not. On the other hand in specific cases where very little variation can be seen, decided symptoms are present. In recent articles on this subject I have explained the phenomenon of paracutic deafness on the basis of a relaxation of the entire chain of os-

sicles in the middle ear causing a stretching of the little ligament of the oval window. This ligament keeps the foot plate of the stapes in place and any derangement of it or the stapes is liable to cause trouble with the hearing. One realizes that this portion of the middle ear is the most vital in transmitting the proper air vibrations to the auditory nerve. The reason why certain deaf individuals hear better in a noise is that a certain amount of vibration is continually acting upon the osscular chain, which thus draws upon the oval ligament and increases its tension so that it reaches more nearly to the normal. As soon as the noise ceases, it again resumes its usual relaxed condition and the hearing for the time being may be worse than it was before.

One may ask how does a case of paracutic deafness arise? In almost all instances, a catarrhal condition of the nose and throat reaching up into the eustachian tube causes a narrowing of this tube with the resultant diminution of air pressure in the middle ear. We thus have in the beginning what is considered catarrhal deafness or what the writer calls progressive deafness. Patients frequently find that by blowing the nose hard, or by holding the nose when blowing, or by attempting to automatically inflate the ears, they can increase the air pressure and after such a procedure they hear better. However, the increased amount of air blown into the ears has no outlet, with the result that the positive pressure must cause a weakening of the least resistant part—the ear drum. As time goes on, the patient has to blow the nose harder or inflate the ear more forcibly until the drum becomes even more relaxed. I have called this pocket handkerchief deafness. Having observed so frequently how few people know how to blow their noses properly, I instruct all my patients never to "blow into their ears." This can be accomplished either by not holding the nose at all while blowing into the handkerchief or else by holding one nostril at a time.

What can one do after the ear drum has become relaxed? This is a difficult question to decide, for one must correct the cause of the condition by proper attention to the nose, throat, and eustachian tubes and at the same time he must use some procedure to tighten up the drum. In a number of these cases I have succeeded in tightening the ear drum by daily applications of irritating solutions—a procedure which should only be undertaken by an experienced otologist. In the numerous cases that I have treated I have never seen any evil results from such applications, although the patient must be warned that while the applications are being made the hearing will be decidedly diminished.

The main point that it is necessary to bring out is that in cases of beginning paracutic deafness, the condition can be frequently arrested if the patient will be careful to see that he does not use his ears as a receptacle for all the thickened mucous in the back of his nose and throat.

11 West 81st Street.

The diagnosis of dilatation of the stomach by palpation, percussion, and auscultation is illusory, and there are many pitfalls. Even the evolution of carbon dioxide and inflating the stomach often lead to misleading results.

The discharge of blood and mucus with the stools, or without them, is always suspicious of a carcinoma of the lower bowel. If none is felt in the rectum, examine the bowel above with the sigmoidoscope.—*American Journal of Surgery.*

Special Article

The Use of Alcohol.

Several writers discuss the value of alcohol as a drug in the *Therapeutic Gazette* for July. A. H. Fussell, of the University of Pennsylvania, says the indications for the use of alcohol as a medicine are few; contradictions are many. His practice is to use alcohol very rarely, and then usually in small doses. When a confirmed alcoholic is stricken with an acute infection such as pneumonia, he gives whisky or brandy, half an ounce, every three hours, from the beginning of the disease, in order to forestall the restlessness and mental disturbance which so often occurs when an individual is deprived of alcohol even in the midst of perfect health. In certain cases of delirium tremens, but by no means in all cases, the small doses of alcohol are recommended. The large doses here again inhibit all of the functions of the body, and are deleterious. In certain cases of advanced alcoholism, where there is extensive arteriosclerosis, as evidenced by degeneration of the heart muscle, of the kidney, and perhaps signs of degeneration of the central nervous system, it is good practice to withdraw the alcohol slowly.

In severe cases of diabetes mellitus, diabetics apparently are able to burn up large quantities of alcohol, not only without detriment, but with great benefit, and in such cases, where it is necessary to give them occasional days of food of small caloric value, to be followed by oatmeal days, during the oatmeal days the alcohol can be used in large quantities with good effect.

In these same cases it can be used as a daily ration of moderate amount. Mild cases of diabetes are better off without alcohol.

Pneumonia, typhoid fever, scarlet fever, diphtheria, small pox, and the whole range of serious infections, have until comparatively recently been synonymous with the use of alcohol, some physicians using it on the theory that it is a heart stimulant, a circulatory stimulant, a general stimulant, or that it neutralizes the toxemia present in the infections. Very few cases of infections are to-day treated without alcohol in some stage of the attack.

Basing my belief on a number of years work, I think that except in certain conditions alcohol in these cases at least is unnecessary, and also I believe it may be full of actual danger.

It is my custom now never to use alcohol in infections, unless, first, the person has been an alcoholic, or secondly, the administration of food is so difficult that small quantities of alcohol, 2 or 3 ounces of whisky or brandy in twenty-four hours, are given in the hope that it will be of some food value. It is *never* used as a heart stimulant, but it may be used as a narcotic; this is justifiable in certain cases, though I think there is scarcely any case which is not handled better by the judicious use of morphine or bromides as a narcotic than it is by alcohol.

In *pneumonia* alcohol is not used routinely, but only as a nervous sedative, when the individual is a user of alcohol. It is not used as a food in this disease. A patient with pneumonia rarely suffers much from his under-nutrition. Severe cases of pneumonia do better with the administration of digitalis, ammonia, caffein or strychnin without alcohol.

In *typhoid fever* alcohol is never used routinely. There are much better ways of increasing the food supply, even granting that alcohol can be utilized as

(*Continued on p.* 65.)

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Another Outbreak.

One of our peripatetic medical "publicists" and confirmed dispensers of alleged wisdom has again advised the people ex cathedra. This time they are told that they ought not to be treated by individual physicians but by a group of doctors. Surgeons should be paid a weekly salary, no matter how many operations they perform. Co-operative groups of people are to employ physicians, specialists and surgeons in this manner, for which service members should pay about five dollars a year.

In the course of this proposal of club rates the statement was made that ninety-seven per cent. of the people do not receive efficient treatment. The solution of their problem is the employment of a large band of specialists, as aforesaid. *Some* of the operations now being performed, said this industrious oracle, are justifiable, but where there are five hundred dollars in the balance, well, human nature decides against the patient.

The oracle thinks that the co-operative bodies should be composed of people of approximately the same means and the same ideas on medicine.

These "publicists" often make it difficult for the critic to write anything about their proposals not of a laudatory character by promptly denying the accuracy of newspaper reports upon which the critic bases his judgment. This is getting to be a most hackneyed trick. We refuse to believe that the reporters of the great dailies are always wrong. Sometimes the "publicist" is cute enough to publish something on the subject beforehand in the medical press and then insist, when criticized for strange utterances, upon nailing the critic down to his printed remarks.

The reader will note how naively the oracle postulates that the members of the co-operative bodies should be people of the same ideas. These intellectual prestidigitators always think of the victims of their notions as carrying them out automatically. They cannot conceive of any difficulties after forming this concept, a concept in this particular case most unflattering to American sense and sensibility. One notes this weakness always in a certain kind of so-called reformer. A good example of his kind of reasoning is afforded by the following, which also applies, by the way, to the reformers who would socialize medicine:

CAT RANCH PROSPECTUS.

Dear Friend:

Knowing that you have some interest in the fur business, I take the liberty of presenting you with what seems to me a most wonderful proposition, in which, no doubt, you will take a lively interest, and perhaps wire me the amount of stock that you wish to subscribe towards the formation of this company.

The object of this company is to operate a Cat Ranch, in or near Oakland, where land can be purchased for this purpose.

To start in with, we shall collect about, say, one million cats. Each cat will average twelve kittens a year. The skins run from ten cents each for white ones to seventy-five cents for the pure black. This will give us twelve millions of skins a year, to sell at an average of thirty cents apiece, making our average revenue about ten thousand dollars a day, gross.

A man can skin fifty cats a day for two dollars. It will take one hundred men to operate the ranch, and therefore the net profit will be about nine thousand, eight hundred dollars per day.

We shall feed the cats on rats, and will start a Rat Ranch next door. The rats multiply four times as fast as cats. If we start with one million rats we shall have four rats a day for each cat, which is plenty.

We shall feed the rats on the carcasses of the cats, from which the skins will have been taken, giving each rat a fourth of a cat.

It will thus be seen that the business is self-sustaining all the way through. The cats will eat the rats, the rats will eat the cats, and we shall have the skins.

Awaiting your prompt reply, and trusting you appreciate the opportunity that I give you and which will make you rich quick, I remain,

Very truly yours,

. . . . . .

It is our belief that the real trouble with the platform fiend is that he runs out of good ideas and then foolishly retails bad ones. Remember that he is constantly at it.

Female Impersonation in the Colleges.

The ruling by Dean Frederick S. Jones, of Yale, against female impersonation in dramatic productions raised quite a rumpus in the newspapers and in the college world. We believe that the ruling permits an individual to essay such parts for not longer than one dramatic season, in order to avoid, at an impressionable age, the formation of new pathways of discharge in the brain, by which certain incoming currents ever after tend to escape. In other words, well known principles of psychology, as laid down by William James, with respect to habit formation, are being taken into practical consideration by those responsible for the character and personality of young college men. When the months of painstaking rehearsal are recalled, both off as well as on the stage, it is easy to understand how years of this sort of thing will leave permanent effects that are

undesirable. And it is not wholly a question of unfortunate mannerisms; it is also a question of psychologic damage.

The men interviewed by press representatives generally denied that impersonators of the other sex ever represented anything abnormal. But these witnesses were all men interested in theatricals at the colleges in one way or another who would naturally and loyally and properly defend their friends and themselves.

We feel sure that the opinions of alienists and those students of sex who know the considerable percentage of homosexuality of both the conscious and unconscious brands would be quite different. There is a decidedly sinister side to the subject which we believe is not discouraged by the college impersonations.

Robert T. Morris points to this sort of thing as one of the evidences of our decadence. He assumes as a matter of course that there is an abnormal element in the practice.

The Yale *News* offers the following fling at the faculty's action:

"First Stude: 'What makes Bill so snobbish these days?'

"Second Stude: 'Oh, he took the part of Prince Ignatz in the Christmas play.'

"Or, to vary the theme:

"She: 'You know I can't understand Henry at all any more. I asked him for some lemonade at the Lawn Club the other night and he made the funniest bow and said: "Yes, Milady."'

"Roommate: 'That's nothing. Every night I come home he takes off my hat and coat and hangs them up for me. He shines my shoes, presses my clothes'——

"She: 'Oh, I see. You're initiating him into something.'

"Roommate: 'Wrong again, Mabel. He was the butler in the Christmas play.'"

Very good, but a boy playing a butler is not a symbol of anything shameful; a boy playing the part of a girl or woman always is, however innocent he may be. A boy playing a butler draws no perverts to an audience and excites nobody morbidly. A boy impersonating one of the opposite sex does not, of course, carry his impersonation with him off the stage; we should surely pity him if he did. But to many of us he is just as pitiable on the stage as off, the more so because he and his young friends, full of the spirit of simple fun, entirely miss the ghastly symbolism, of which, in their wholesome youth, they know nothing.

They should be forcibly saved from what Morris alludes to as what "every one knows who is in a position to hear the undercurrent of conversation."

The Relation of Morbidity and Mortality to Wages.

Bernard Shaw, in "Major Barbara," emphasizes very clearly the relation of decent wages to decent living, health and mental and spiritual growth. Henry Ford has also made a demonstration of the good effects of proper wages upon honest workmen and upon ex-convicts. General Gorgas has enunciated, and proved at Panama, the principle that only by the economic elevation of the toiling masses may the largest results in health and life saving be achieved. Our Government's Children's Bureau at Washington has reported an average infant death rate of 134 out of every 1,000 babies in a steel making and coal mining town, against a rate of 84 per 1,000 in a residential suburb. A great contrast was found between the most congested section and the choicest residential section in each of these two communities. The report lays down the law that "the more favorable the civic and family surroundings and the better the general conditions of life, the more clearly are they reflected in a lessened infant mortality." Excellent results have already followed in two communities through the securing of infant welfare nurses, improving the milk supply and arousing community interest.

General Gorgas believes that a revolution in our system of land taxation, perhaps along the lines of the single tax, would "secure for all mankind natural wages." The syndicalists urge ownership of the means of production by the workers themselves. Other radical measures are proposed by various reformers. In the light of our present knowledge of the economic principles upon which health, longevity, happiness and efficiency depend, it is inevitable that great fundamental changes will occur unless the master class awake and see the writing upon the wall which warns them to give unto labor its fair share of the profits of industry before it is too late, and to mitigate the greed wherewith they are piling up fortunes wrung from the blood and sweat of the workers, fortunes which are the base equivalents of the lives and souls of fellow human beings.

Group Imbecility.

In all our considerations of social and industrial exploitation we over-emphasize the greed and oppressiveness of the master class. But little account is taken of a great factor that enters into the problem, and that is group feeble-mindedness. The degree to which people can be exploited must often be a revelation to the exploiters, and the boldness of the latter in activities unfortunately affecting great numbers of the public is often best accounted for on the basis of knowledge concerning the defectiveness of the victims.

There are some rough and ready criteria by which we can judge the appalling simplicity of a large portion of the public. One of these is childish amusements like the Charlie Chaplin cult. The spectacle manifested by those who pay continual devotion at this shrine, and at that of the sentimental and wholly banal type of movie which is presented in most of the houses, is one of the most deplorable and depressing in the whole range of modern social phenomena. The apparent impossibility of inducing large portions of the public to practise personal hygiene of the most elementary sort is another index of the rough and ready kind. The behavior of the masses in time of war or of threatened war is another significant thing. The ease with which they can be swayed by "accelerators" employing factitious slogans, like specious appeals to alleged patriotism, is astounding. The facility with which they can be cajoled by pensions, bonuses and compensation devices in lieu of proper wages, is unbelievable. Their total inability to sense property abuses, demagoguism, and charlatanism, their ignorance of, and inability to comprehend, the tenets of their played out sects, and their entire willingness to listen every week throughout their lives, in the name of religion, to some commonplace mind's stupid outpourings—all these things are evidence of their imbecility.

We know a good deal about the hysteria and lunacy of the crowd, but these are acute and spectacular phenomena. We need to study more carefully the crowd's chronic imbecility. The eugenic, political and industrial bearings of this group feeble-mindedness are most important.

Miscellany

CONDUCTED BY ARTHUR C. JACOBSON, M. D.

The Profession's Ills Diagnosed.

H. L. Mencken, interpreter to America of Nietzsche and brilliant *littérateur,* has written a piece in the Baltimore *Evening Sun* on the reason why the physician has fallen in public esteem of late, in which, with his usual insight, he searchingly analyzes our problem. It is from extra-professional sources such as this that we oftentimes get proper perspective.

"In proportion," says Mencken, "as the art of medicine has advanced in exactness and efficacy the public belief in it has declined. There were quacks, true enough, a century ago, but they were not nearly so numerous and prosperous as their successors of to-day, nor were they powerful enough to seek and obtain legal countenance, as has happened in the cases of the Christian Scientists, the osteopaths, and, to a certain extent, the patent medicine mongers. The best physician of a century ago was actually far less competent to diagnose and treat disease than the average barber or bartender of the present, and yet no one ever ventured to dispute his procedures publicly, and his good faith was seldom doubted even *in petto*. . . . The cause of the change now visible is not far to seek. It does not lie, as the superficial observer may conclude, in the fact that the public is better informed, for that would make it even more suspicious of quacks than it is of scientific physicians, but in the fact that the physician himself is better informed. Disease after disease has yielded to laborious pathological investigation; the physician knows its nature exactly; he can often cure it certainly. But in proportion as he has learned the *nature* he has had to abandon his old ready assumptions as to the *cause* of disease, and his honest admission of the fact has brought about the decline of public confidence in him. People are not content to know what ails them and how it will probably affect them; they want to know, in addition, what *caused* it. Here the educated physician must confess his ignorance, and the quack can answer with assurance. The former may point to the *bacillus typhosus,* but he must always admit that he doesn't know why it brings down one man with typhoid fever and lets his neighbor escape. The latter makes no such damaging admission. If he is a Christian Science healer, he talks sonorously of Error and Mortal Mind; if he is an osteopath, he has plausible gabble about the pressure of misplaced bones on nerve trunks; if he is a patent-medicine monger, he has some other and equally easy explanation. Thus the educated physiclan slips backward as he goes ahead, and in some countries—*e. g.,* England—he has actually come to the verge of ruin. Nor is he likely to recover when the actual cause of disease is discovered, as may happen in a few years, for that cause is almost certain to be inordinately complex, and hence as incomprehensible to the general mind as the chemistry of metabolism or the theory of immunity. The quack will always have an easier answer, and, being easier, the populace will accept it as the more plausible."

The Mortality of the War on This Side of the Water.

The mortality of the war on this side of the water must be considerable. We should like to see some statistics worked up on the subject. The hospitals of the city of New York are kept much busier than they are in times of peace with stab-wounds and gunshot-wounds. These are incurred in the course of squabbles over the European war. Wounds of this sort are quite common in times of peace, but a war like the present one gives a tremendous fillip to their infliction.

Psychology of the Eugenist.

We spent an evening recently with a gentleman who is very active as an advocate of eugenics. He is the father of a child about two years of age. The child is a normal boy. In the course of the evening we had occasion to note that the father had some odd notions about his boy. To the father's mind and eye the boy was a prodigy of physical and mental attainments. Pictures were shown, measurements given, occurrences showing the child's astounding mental powers were cited, and the child was exhibited with a challenge. Had we ever seen a more perfect specimen? Did we dare to whisper such an implication?

The significance of this estimable gentleman's sincere belief that most of the babies in the world were relatively unfit began to dawn upon us the next day. Of course most of our readers would have been "wise" at once, but we are rather dull about such matters.

And now, still later, the thought breaks in upon us as we write this, in how many of our rabid eugenists does this man's brand of psychology operate and account for their fanaticism?

Pilot Fish.

When we feel apprehensive about the threatened inroads of barbarians in the form of New Thought healers and all the other cultists, and set ourselves to devising legislative and other means of safeguarding ourselves, we seem to forget that all these people are at the present moment practising medicine just as hard as they ever can. They have large meetings on Sundays and "classes" throughout the week which keep them very busy. And there is a horde of these "teachers" in the state and country.

For the life of us we can't see that laws make much difference in these matters.

Prohibition in a state does not lessen the number of booze fighters or consumers of patent medicine dope.

Our Medical Practice Act has no effect whatever, so far as we can see, upon the activities of these picturesque practitioners.

It is only the crude and ignorant fakers who become entangled in the net of the law. The high-class crooks commit no concrete offenses upon which they can be held. They are like the abortionists who carefully exclude possible corroborating witnesses. Their treatment of the individual is a teaching of abstract principles. They don't pretend to diagnose anything and they don't do anything. What you pay them for is instruction, not treatment. Whether handling friends or agents of the medical societies and district attorney they are on pretty safe ground.

And there you are.

A Limitless Field.

The man in the street, in these days, is surely surrounded by numberless reminders of his defects. We should think that the neurasthenic layman and his neurotic sister would find these reminders perturbing. He picks up the paper, does our neurasthenic layman, and staring at him is the question: Does fatigue poisoning show on your face? Then follows an argument in favor of heels of new, live rubber. He turns the page and is confronted by a gruesome disquisition on the evils of coffee drinking. Turning to a weekly the first thing he encounters is an elaborate advertisement in which is pictured *himself* contemplating suicide—something entirely unnecessary, says the advertisement, because Somatone is on the market. Under Health Talks, in the street car, the suggestion is made that "Perhaps you do not realize that your trouble is due to constipation," something easily remedied by Petroline.

Our friend is reminded at every turn of his flat

feet, of his bowels, and of his digestion. He is not permitted to forget how to prevent or cure his pyorrhea alveolaris by the use of somebody's tooth paste, or that his increasing bald spot can easily be rehaired by the application of Bunk's scalp magic. His headaches and his nerves, his turbid urine and his palpitating heart, all are taken into account.

Through this kind of suggestion sound as well as unsound people become persuaded that they are pathological museums. While doubtless most of the public are physically defective, but few possess any great number of defects, so that the sound and unsound are alike appealed to in behalf of many remedies that neither needs.

We suppose that as time goes on our advertisers will become even more astute and adept in their art, and far better informed about the ills of the flesh. But in the meantime things are bad enough, the Lord knows. The possible victim of beginning cancer of the stomach is beguiled into using Bull's indigestion cure, people with serious vascular disease experiment with alleged remedies for nephritis, arteriosclerosis and high blood pressure, and those with unimportant functional troubles think from the description of symptoms that they read that they are the victims of vascular disease. We read advertisements promising that by the employment of Bink's stabilizer, at two dollars a bottle, one may drink coffee to excess without harm resulting, or use tobacco in the same way with impunity. What is to prevent the advertisers from eventually covering all the diseases of note? Why should Graves' disease be slighted? Bear in mind that it doesn't matter whether the readers of the advertisements really have Graves' disease or not. Many people, if it were suggested to them through advertisements that prominence of the eyeballs is a symptom or sign of Graves' disease, would buy the alleged remedy, for everybody's eyeballs are prominent, when you come to think of it.

The advertising of remedies is in its infancy yet. Manufacturers with "vision" know that only through the prevention or corruption of the proposed Federal Board will they see their hopes realized. Its birth has been effectually prevented to date. Its future advent will not necessarily mean the end of the great farce.

Happy Hospital Patients.

Dr. Ralph Thompson, of St. Louis, writing in the November *Interstate* of his experiences and observations "somewhere in France," speaks of the human manner in which patients are handled in the French hospitals and attributes the remarkable results they are getting largely to this fact. The idea of the hospital makes one sick, which is wrong. Any little pleasure or comfort that one has been accustomed to in his life is immediately interdicted upon entrance to the hospital. Smoking is denied him the moment he enters. In the French war zone they give a man whatever he wants. Thompson makes the suggestion that we would save all of the hospital days that have been lost by the people who are involved in the great war if we would apply similar treatment to our patients in our hospitals.

We were once markedly impressed by the excellent results obtained in patients suffering from pneumonia and craving for cigarettes who were allowed to smoke. This would seem above all things insane, but we saw men who were doing badly immediately improve and continue to improve, and that fact always counts for more than theoretical objections.

Strange, Isn't It?

You are consulted by a gentleman of sixty who, you find, has a systolic pressure of one hundred and ninety and a diastolic pressure of 120. He insists that he feels fine. He weighs 210 pounds and has an abnormally protuberant abdomen. The urine shows nothing and the heart is in far better condition than one would expect to find it. You tell him the significance of things and advise him as to how he shall live and eat, etc., in order to conserve his vitality. You restrict his diet and perhaps give him some iodide of potash, or a little nitre. You see him two weeks later and he has lost ten pounds, mostly from the abdominal region. His pressure has fallen ten points at both ends. You see him in another two weeks and find that he has lost five pounds more and that both pressures have fallen further, but that the systolic pressure has fallen relatively faster than the diastolic, so that the pulse pressure is beginning to approximate the normal. You feel quite proud of yourself and are certain that you have rendered a real medical service that will be lasting in its results. Then a week later you learn that your wonderfully improved patient fell dead the day after his last visit to you.

Odd, such happenings, aren't they?

Ward Manners.

Why do *some* attending men go into their public wards and talk with their patients about their troubles as though everybody else in the wards were directly interested? They don't act that way with their private patients. Why do they modulate their voices in the one case and shout like teamsters in the other? It is our belief that attending men should be gentlemen in all circumstances, and that gentlemanly conduct should not vary according to what one may consider varying sensibilities in patients. There is something crude, anyway, about the man who assumes that the public patient probably has less sensibility than the private patient. But whether he has or not does not affect the matter in question. That is our point.

What is the Limit?

We read about the decision to permit the dear public to eat horse flesh at the same time that we read about the decision of the old Republican trust magnates at the Gary-Roosevelt dinner to lay the country's burdens on the common people by way of the tariff instead of paying it themselves through a direct Federal tax on pig-iron and steel. Such announcements go together well; such facts relate themselves automatically.

It is only a prejudice we have had against horse flesh, we are now informed.

And we shall then eat cat and dog meats; that is, most of us. Of course, Mr. Gary and his friends will not eat them.

Our rulers must surely be surprised sometimes themselves at what they get away with.

We should not be a bit surprised to see standards of living in America forced far below their present points. The removal of the prohibition on horse meat and the complacent acceptance of the new food convinces us that our masters could go much farther.

(*Continued from p. 60.*)

food. It is valueless in the so-called typhoid state, with delirium, unconsciousness, and rapid pulse, unless this condition is the result of withdrawal of the usual dose of alcohol. Camphor, caffein, or ammonia, and not alcohol is beneficial.

Scarlet fever and diphtheria, for the same reason, do not call for alcohol in large doses.

An almost universal use of alcohol is to revive an individual in a faint, or after a hemorrhage or one who is in shock.

Alcohol is used here with the thought that it is a heart stimulant, or at least a circulatory stimulant.

In practical every-day work the following statements will hold good. It is true that the spirits swallowed by an individual semiconscious from fright, shock, or hemorrhage will in many instances cause the individual to feel better. If a large quantity has been used, which is very likely to be the fact, the narcosis which follows may prevent the organism from regaining its usual tone, and may indeed turn the tide in the wrong direction.

In a chill an individual certainly feels warmer after the use of alcohol, but it is the warmth due to dilatation of superficial veins, and is not a true stimulation. It is much better to use ammonia, or caffein, because they are actual stimulants and have no bad after-effects.

Alcohol is contraindicated as an appetizer and as a food. It may perhaps be true that alcohol can be consumed as a food, but except as noted above in its use in infections or in diabetes, it should *never* be used as such. Other foods certainly have greater caloric value, and certainly are free from danger and less irritating.

In all stages of tuberculosis, alcohol is contraindicated. Certainly the tuberculous individual needs all his powers of resistance. If alcohol in any way lessens ability to stand fatigue, it should not be used. It is a mistake to use alcohol to whip up the appetite in tuberculosis; any extra amount of food which may be taken from this cause is negative to the ill effects of the alcohol. In functional nervous conditions the very great danger of establishing a habit far outweighs any theoretical value of the alcohol. To establish the habitual use of alcohol by advising or courting the use of the drug is little short of criminal.

Exposure to heat and cold, such as is undergone by explorers in the tropics and the arctics, or even the moderate degrees of heat and cold of temperate climates, is followed by much more serious results when alcohol is taken than when it is not. This has caused arctic explorers to fobid its use. Another contraindication is snake bite and other acute poisoning. The use of alcohol in these conditions is worse than useless, and either the intoxication or death, or both, are likely to occur when it is so used.

In normal health the use of alcohol as a beverage is pernicious in a high degree. Whatever the views of physicians and pathologists may be as to the direct causative influence of alcohol upon arteriosclerosis, sclerosis of the kidneys, or the liver, or the central nervous system, and whatever views exist as to the ability of the organism to burn up certain small quantities of alcohol and utilize it as a food, there is no difference of opinion as to the harmful physical effect of quantities of alcohol above the ability of the body to completely consume it. It lowers resistance to heat and cold and to infections, it diminishes the power to withstand physical and mental exertion, and above all it puts habitual users of alcohol in the position of either yielding to the increasing appetite for the drug or being constantly on guard, in order to prevent themselves from yielding.

H. A. Hare, of Jefferson Medical College, in speaking on the clinical use of alcohol said that alcohol can no longer be considered as a stimulant in the crude sense in which that term was employed years ago. So, too, the view has been brought forward, although held by certain investigators for many years, that alcohol in moderate amounts is burnt up in the body and in the process of this combustion gives force to the organism, and in certain instances, because of its easy combustion or oxidation, distinctly aids in the conservation of tissue. Not only does it do this by giving force but it saves the tissues, in that it is burnt up so readily that the less easily burnt-up tissues escape.

This being the case it is not difficult to reach the conclusion that alcohol, properly used, has a very definite position in the materia medica list, and can be used with advantage in certain cases of diseases which are characterized by great tissue waste, notably diabetes mellitus, typhoid fever, and certain cases of tuberculosis, and in certain stages of other maladies. Hare believes that these are facts, and that those who are sweeping in their condemnation of alcohol as a remedial agent are, at this time, unable to present any evidence which can satisfactorily controvert these views; always bearing in mind, however, that this drug, like others, must be administered in doses which suit the needs of the patient in the particular stage of the disease, and the particular time of the day when he needs the drug.

Alcohol has been modified in its dose probably more than any other commonly used drug, yet there still remain some conditions in which it is proper to administer large amounts, and failure to do so may result in failure to get a good result, the patient, therefore, missing an opportunity for recovery as completely as if he received doses of the drug which, to use a popular slang phrase, "soused" him. These conditions are some of them as follows: Patients who have prior to illness become accustomed to taking considerable quantities of alcohol every day—many of these patients will fail to get along well and possibly die if the physician does not think of the necessity of administering alcohol in some form. This is particularly true of those who suffer from pneumonia and typhoid fever as types of acute disease, and diabetes as a type of a chronic disease. Hare says "good whisky" must be used. In his experience standard blended whiskies usually agree with the patient very much better than a straight whisky, but the blend should be a skilful one, for a badly blended whisky is more prone to do badly for a patient than is a straight whisky. In other instances, usually for only a brief space of time, a good brandy gives the best results, particularly when prompt, so-called stimulation or rallying of the patient is demanded, but brandy in his experience is not a good stimulant to be continued over a considerable number of days, even when given in smaller quantity and with an allowance for the difference in the actual alcoholic strength between it and whisky. It is less sedative in its effect, and if delirium is present is, more prone, unless the doses are very large, to produce excitation than is whisky, which, if properly used in excitable cases produces sedation.

In regard to the use of wines as stimulants during illness, it is pretty well recognized that none of them are suitable for continuous administration over many days. Port, being a fortified wine, is too sweet; the patient tires of sherry very rapidly, and champagne, even if extra dry, is very prone to upset the stomach.

There are at least two phases of the action of alcohol which should be carefully considered, one that it gives energy and saves tissue. The other points deal with its influence upon the circulation, and its power in combating infection aside from any mere increase in vital resistance by energizing the body. Instead of believing that alcohol acts as a stimulant, increasing the force, vigor, and blood-pressure of the circulation, we now believe that the value of alcohol, so far as the circulation is concerned, lies in its ability to adjust the circulation so to speak, or, its power to equalize the circulation. There can be no doubt that the influence of alcohol in re-establishing circulatory equilibrium is one of its advantages, and its circulatory effect is one which brings benefit to the patient in the congested areas of the deeply situated portions of the body, while the peripheral tissues which have been poorly supplied with blood are freely flushed with this fluid.

It is a common clinical observation that after the administration of alcohol the peripheral circulation is increased in the ordinary individual who is exposed to cold. The taking of alcohol warms the extremities by dilating the blood-vessels in the parts that are chilled and filling them with warm blood from the centers of the body. In fever when the trunk and deeper portions of the body are pyretic, alcohol, by moving the superheated blood from the deeply situated organs to the peripheral portion of the body, not only equalizes the distribution of the blood in the body but by increasing the dissipation of heat so lessens fever, a tendency which is increased if, in addition, the skin, which has heretofore been hot and dry, becomes moist through dilatation of its capillaries. In the case of the person who is exposed to cold the distribution of the blood under the influence of alcohol is disadvantageous in that it causes him to lose too much heat. In the case of the patient who is feeble and febrile this effect of alcohol is useful in that it acts as an indirect antipyretic and thus re-establishes the circulatory equilibrium, which is responsible for the improved appearance of many febrile patients when alcohol is properly given.

There is no need for the administration of alcohol in those types of fever which older practitioners are prone to call sthenic fevers. They are so short in their course that the body is not deprived of a great amount of energy and the fever does not run long enough to sap the vitality. Thus it is rarely needed in ordinary croupous pneumonia in a person who is non-alcoholic; and in the fevers of childhood, like scarlet fever, alcohol rarely serves a good purpose.

Discussing the view that alcohol not only enables the man sick from a severe infection to combat that infection not only by providing him with a readily oxidized food, but in some manner as yet unknown seems to increase the phagocytic power of the blood and still more surely increases bacteriolysis. Hare says he carried out a series of experiments in cases of typhoid fever and tuberculosis in which he proved that alcohol distinctly increases the bacteriologic power of the blood serum. He still believes very firmly that in the presence of various forms of sepsis and severe infection the surgeons of thirty years ago were entirely correct in their belief that "quinine, iron, and whisky" were the best remedies for such persons, and when we recall more cases of sepsis in one year than a surgeon of today sees in a lifetime we must believe in their clinical conclusions if we believe at all in the axiom that experience teaches.

We cannot afford to accept too quickly evidence that comes from the laboratory or from the bedside, nor can we afford to condemn universally a remedy which does not seem in the laboratory to do to a healthy dog what it does to a sick man. No better illustration of this can be afforded than alcohol given to a healthy man in distinction to alcohol given to man in disease. Given to the man in health, except under certain circumstances, and in very carefully graded doses, it is harmful because it affords him something which he can burn up readily and thereby is prone to interfere with the proper oxidation of his ordinary foodstuff; whereas, given to a man in fever whose ability to assimilate food is impaired and whose circulation may be impaired and disordered, it provides energy, acts as a foodstuff, and regulates the circulation.

The American Association of Clinical Research

James Krauss, M. D., Permanent Secretary and Editor.

CARCINOMA: EXPERIMENTAL ETIOLOGIC INVESTIGATION: SUMMARY OF FACTS ELICITED.*

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Statistics show us that during the past fifty years there has been a steady increase of cancer from 9 in 100,000 to 80 in 100,000. While important discoveries have been made, and a great mass of work has been done, there still remains the fact that definite knowledge of the etiology of cancer is not known. I believe the chief reason that more has not been accomplished toward the solution of this problem is because so much time has been wasted seeking the cure instead of the etiology. The surgeon has made far greater strides in mechanical efficiency than the internist in his knowledge of the value of internal treatment. Pharmacology in relation to this disease has been at a standstill for many years.

The general health of the patient must be taken into consideration, and all complications corrected. This can be accomplished by the use of selected remedies, and this one fact must be studied by every physician. It is necessary that we not only listen to highly scientific men, but to the average progressive investigator as well. Let every physician keep a careful record of his observations of each individual case of cancer and make this available for the investigators. At present our hundreds of theories leave us in a chaotic state.

For several years I have taken an active part in the investigation of the etiology of malignant tumors of the carcinomatous type. While the results obtained up to the moment are too few in number and too indeterminate in character to warrant any positive statement, the author feels that the facts already elicited are of sufficient significance to render advisable their presentation to his many fellow workers in this most important field. Since the summer of 1914 I have been unable to carry on the laboratory research, owing to the lack of funds for such work; but as a result of the previous laboratory findings I have been able to combine with my professional work the experimental

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study of immunity and its bearing upon the treatment of carcinoma. The knowledge thus gained will prove most valuable for it has brought out the relationship between metabolism and immunity.

It is definitely known that there is present in the body an abnormal metabolic condition; an inco-ordinate state exists; elimination is overtaxed; catabolism is greater than anabolism, with the result that toxins of a different nature from normal excretory products act upon the nerve centers and seemingly upon the inhibitory side. How can one with the knowledge of metabolism draw a line of demarcation between it and immunity. What is immunity but a process of building up?

My theory was formulated during the early part of 1908. I then regarded that when normal cells are excited to pernicious activity it is due to the presence of an abnormal chemical substance within the cell which has direct action upon the nerve centers, regulating cell growth. If this theory of the origin of carcinoma be correct, then the tissue undergoing these pernicious changes should contain the toxic substances responsible for the continued growth and propagation. Working from my theory already stated, I attempted to isolate the toxic substance by the following procedure:

From cases of operable tumor, when a diagnosis of carcinoma had been positively established both by clinical and microscopical findings, the freshly extirpated growth was carefully freed from the fat and extraneous tissue adhering to it. Experience shows that tumors of small size and those in which the degenerative changes incident to "breaking down" are least manifest, are best suited to the purpose. This fact is in accord with the outlined theory, as the toxic substances should be present in largest amount in those cells exhibiting the maximum of activity; namely, those in the tumors showing the most vigorous growth. The tumor substance was then cut into very fine pieces, using a clean bowl knife, the resulting mass placed in a clean vessel, preferably of porcelain, and extracted with water at the boiling temperature for three hours. Deep vessels of Berlin porcelain were found to be desirable for this purpose. The mass was then filtered to remove the exhausted residues, the clear filtrate containing those portions of the tumor which were soluble in water. This filtrate was rendered slightly acid with sulphuric acid of the highest purity, and again boiled to coagulate the soluble protein substances, the coagulum then being removed by a second filtration. The slightly acid, aqueous filtrate was next exactly neutralized with barium hydroxide solution. (As an indicator phenophthalein was used; and to avoid contamination of the solution the end point reactions were carried out on porcelain plate.) The barium sulphate precipitate was next completely removed by filtration. (If the neutralization takes place in a solution heated nearly to the boiling point, the tendency is for the barium sulphate to precipitate in the crystalline form. Under these conditions it filters out far more cleanly than can be attained by a cold precipitation. Under the most favorable conditions it is the most unsatisfactory inorganic substance which we are called upon to remove from a solution, inasmuch as it betrays a tendency to assume the colloidal form, and under these conditions separates slowly and imperfectly.

The exactly neutral barium-sulphate-free, aqueous solution was next concentrated, (it seems probable that this step could be carried on with advantage by evaporation under diminished pressure) the resulting syrup-like substance extracted with absolute alcohol in liberal proportion, and the alcoholic extract filtered from the insoluble residue. This completes the separation of the protein materials, all of which are completely insoluble in alcohol. The alcoholic extract was freed from the solvent by evaporation. The residue from the alcoholic extraction was next thoroughly extracted with ether. This ethereal extract should contain all of the fat, and be rejected. The residue insoluble in ether was now dissolved in water, and the solution rendered strongly acid with phosphoric acid. For this purpose the aqueous solution of ortho-phosphoric acid is probably the best suited, as this is thoroughly hydrated and consequently exercises no de-hydrating action. The acid aqueous solution was now extracted with ether and the ethereal extracts saved, while the aqueous residues were rejected. The ethereal extract was removed by distillation and the residue again dissolved in water. To this aqueous solution, which is acid in reaction, an excess of very pure zinc oxide or zinc carbonate was then added, and the whole mass boiled for at least thirty minutes. Removing the undissolved zinc oxide by filtration and discarding it, the clear alkaline, aqueous solution was then allowed to evaporate spontaneously. Under these conditions the crystals gradually formed, and were readily removed from the solution. The crystals were purified by successive recrystallizations from water, and these in their final purified form were the basis of the subsequent investigations. Up to the present time their exact nature is not known, and extensive and exhaustive investigation will certainly be required to determine their exact chemical constitution, if, indeed, the problem be one ultimately susceptible of solution. Whatever the exact chemical constitution of this compound may be, this much is evident, that the substance or substances secured by this method of procedure have been freed from all organic life, and any results obtained by its use must be referable to its own inherent chemical nature and not to the presence of organized life in any of its manifold forms. The experiments carried out with this material may now be considered in detail.

The crystals prepared by the method just outlined showed a sparing solubility in water—about 4 parts in the hundred—and for convenience sake carefully sterilized aqueous solutions were used in all the experiments to be described. Having isolated a substance from the malignant growths, the next step was to determine its physiological action and the form in which it was manifested. Rabbits were selected for the initial experiments as they are not normally subject to tumor growths—a condition which of course forbade the use of mice and rats—and further, so far as the author has been able to learn, had never given positive results in experimental tumor production. On the contrary, they seem to show a high degree of resistivity to pathogenic influences along this line. Eight healthy animals were selected for the first experiment; four for injection with the solution, and four to be used as controls. Each member of the first group was subjected to the influence of the substance, the condition of experiment with each showing some minor variations, but all following the same general plan. At the time that the regular injections were made on the experimental animals, sterile salt solution was injected under precisely the same conditions into the controls. The results obtained with the first group may be briefly considered as a whole: each of the four received an injection of 0.25 c. c. of the sterile 4 per cent. solu-

tion, corresponding to 10 milligrams of the active substance, the operation being performed under strictly aseptic conditions. In each case a local disturbance developed at the point of innoculation, which gradually increased in severity. In addition there developed a general constitutional manifestation which included an increase in temperature, with much restlessness, followed by a somewhat lethargic condition with an apparent dullness of all the senses. The constitutional symptoms persisted for perhaps 24 hours, after which three of the rabbits were restored to their normal activity and apparent good health for a period of several days. The fourth rabbit (No. 3 of the series) developed a septic condition, probably as the result of faulty technique, and died at the end of the third day. After the period of several days of apparent good health, a gradual change was observed. The rabbits slowly lost in weight; there was a progressive diminution in activity and bodily strength; they became anaemic, as evidenced by the pallor of the membranes; in short, a general cachectic condition developed, which terminated fatally in less than three months. The local disturbance in the meantime showed induration, with a continuous increase in area. In one instance there was marked breaking down, attended by the complete destruction of a large amount of tissue. In each instance the rabbit presented the clinical picture of malignant disease, the degree of the development of the specific manifestation varying with the site of the inoculation. The individual case histories may be considered in brief:

1. This rabbit, a healthy adult of about 2200 grams weight, was injected four times at intervals of ten days, in the peritoneal cavity, the total dosage being 80 mg. This rabbit, after the illness described above, died on the 48th day. Autopsy showed a general peritonitis with marked softening of the cavity contents. No positive carcinomatous foci were discoverable.

2. This rabbit weighed 1800 grams. Two subcutaneous injections of 10 mg. each were made into the abdominal wall at an interval of 10 days. At the point of inoculation a growth developed, which ultimately attained a diameter of 5 cm. There was complete loss of hair over the region, marked thickening of the skin and induration of the edges of the growth. The usual constitutional symptoms were observed. Death resulted on the 64th day. Autopsy showed the above microscopic findings with a slight increase in the mesenteric and peritoneal glands. Microscopic examination of these tissues showed a marked increase in the epithelial cells, with invasion and destruction of the connective tissue. The glands were the seat of an acute inflammation.

3. As has already been stated, this animal died on the third day in a septic condition. The tissue at the point of inoculation showed marked inflammatory changes upon microscopic examination.

4. This rabbit weighed 2400 grams. One inoculation of 10 mg. was made in the mammary gland. This animal showed local symptoms similar to those exhibited by rabbits 1 and 2, the degree of involvement, however, being far greater than in the other cases. At the end of the 24th day a portion of the gland was removed, and this on microscopical examination showed the characteristic features of malignant disease. The wound caused by the removal did not heal, and the tumor development progressed with increased activity. There was much destruction of the tissue surrounding the wound accompanied by little, if any, secondary infection. The constitutional symptoms were marked throughout, and the rabbit died on the 78th day. Autopsy showed the skin surrounding the focus of the growth to be involved; there was a marked venous engorgement throughout the body, and an increase in the exudate in all the serous cavities. The mesenteric and peritoneal glands were enlarged, and under the microscope gave unmistakable evidence of metastases.

The results obtained from this preliminary experiment indicated that the tumor extract possessed, first, a marked toxicity, and, second, the power to reproduce in healthy tissue growths similar to that from which it was itself derived. In the course of the subsequent experiments the latter point was still more strikingly illustrated and these observations may well be described at this point.

5. This animal was a large female Belgian hare of about 2800 grams weight. The first injection was given subcutaneously in the abdominal wall, the amount being 0.1 c.c., corresponding to 4 mg. of active substance. At the end of ten days a second injection was made of 0.25 c.c., or 10 mg., in other respects similar to the first. Ten days later a third injection was made, this time of 20 mg. of active substance. At the time of making this injection it was noticed that a hard swelling had appeared on the under side of the neck. As this gradually increased in size, but one more injection, this time of 10 mg., was made at the end of the next 10-day interval. Thus, in 30 days the hare received 1.1 c.c. of solution, corresponding to 44 mg. of the active substance. From the time of its first appearance the tumor gradually increased in size until at the time of death it had become as large as a hen's egg. During the period of tumor growth the animal exhibited the typical cachectic condition which had been shown by the earlier rabbits, and the general constitutional disturbance ended fatally on the 40th day. The post-mortem showed the large tumor to be a typical carcinoma involving the thyroid. In addition, the mediastinal and mesenteric glands were covered with carcinomatous foci varying in size from a pin head to a pea. The liver was the seat of a number of similar tumors, and the pleural cavity showed numerous patches of incipient inflammation. The general picture was that of a typical miliary carcinomatosis and the histological examination demonstrated conclusively the malignant character of the growth.

6. This rabbit weighed 2800 grams. The general method of manipulation was the same as in the preceding case, the animal receiving 1.1 c.c. in three injections within a period of 30 days. This animal showed the characteristic progress of a general cachexia, the main macroscopic lesion being a tumor which developed on the side of the head under the right eye. Before death intervened this had grown to a very marked extent, involving the nose, cheek and orbit of the eye. The tumor gradually broke down with much loss of tissue, the general progress being highly typical, and the microscopic findings wholly confirmatory. The post-mortem showed the establishment of a large number of metastases, especially in the mesenteric glands.

7, 8 and 9 all showed similar results. the focus of the main lesion varying, although in every case the injections were made subcutaneously in the abdominal wall. In one the tumor developed on the left foot and progressed to the point where the foot and first joint entirely sloughed off and the bones of the second joint projected from the stump. The two others showed head tumors, but at different points, one appearing on the lower jaw, while the other was beneath the left eye.

These experiments, in connection with the histological findings leave no question that the substance prepared by chemical means and in a manner which wholly excludes organic life, is capable of producing a general carcinomatosis when injected under sterile conditions into healthy adult rabbits.

During the course of the experiments just detailed, a second series was carried out to determine the character and degree of general toxicity of the tumor substance. For this study both guinea pigs and rabbits were used. With the former it was found that 0.5 c. c. of solution, corresponding to 20 mg. of active substance, when injected subcutaneously into a 250-gram guinea pig, would produce death in about two hours. The general course of the symptoms was as follows: Time varying after injection, depending somewhat upon size of animal, a general tetanus developed, in many of the cases there being a well-marked trismus and breathing in paroxysm. The spasms were both tonic and clonic.

Autopsies performed upon several of the guinea pigs showed a marked venous engorgement throughout the body with increase in quantity of fluid in all the cavities. This latter was especially marked in the peritoneal cavity where some 10 c. c. of a brownish exudate was found. This exudate, when carefully removed under strictly aseptic conditions and kept in a sterile tube, would produce an intoxication in a healthy guinea pig similar to the one described on the injection of a quantity not exceeding 0.2 c. c. The increase in the toxicity of this exudate over that of the original substance will be considered at a later point in this paper.

Paralleling the experiments with the guinea pigs, a number of studies were made on healthy adult rabbits. The subcutaneous injection of 0.5 c. c. of the solution produced an intoxication in the rabbit, differing only in degree from that of the small animal and ending fatally in about 12 hours. It will be noticed that the lethal dose is identical with that used in the first experiments in which only slight primary effects were noticed. This is explained by the fact that the material used in the earliest experiments was the first prepared, and consequently at a time when the experimental technique was in process of evolution. That it was less pure than the succeeding preparations was evidenced by the fact that the crystals had a distinct brownish color, while all the later samples were comparatively white. It is certain that the specific toxicity of the sample was lessened by the admixture of impurity, the 4 per cent. solution of necessity containing proportionately less of the toxic substance. Further, it is not impossible that the extraneous material might have had an antagonistic action upon the physiological effects of the poison.

With the exception of the four animals of the first experiment, however, all other injections were made with the pure, uniform material of later preparation. When the rabbit was injected with 0.5 c. c. of the solution, as before stated, on returning it to the box it remained quite motionless for some little time. At the end of fifteen to twenty minutes the eyes became duller, and in half an hour a period of great restlessness began. This progressed in a short time to a well-marked tetanic seizure. There was well-marked trismus, the spasms, as with the guinea pigs, being both tonic and clonic. It is interesting to note that any disturbance of the animal during a period of remission excited a fresh convulsion. During the earlier part of the convulsive period the heart action diminished until it was restored to the normal. From this time on, the action gradually became slower and weaker, until the ultimate cessation of movement. In the experiments thus carried out, death ensued about 12 hours after the time of the injection.

Since the peritoneal exudate of the poisoned guinea pig showed such a marked increase in toxicity, it was thought well to try its effect on the rabbits. Of this exudate 0.5 c. c. was injected intra-peritoneally into a healthy adult rabbit. An intoxication similar to that already described rapidly set in, and the symptoms developing far more rapidly than in the previous experiments, the poisoning ended fatally in an hour. From this it is clear that the tumor extract excites a pernicious cell activity, in the course of which toxic matter is formed. Furthermore, the production of fresh poisonous material must progress at a rapid rate, as one-twentieth of the peritoneal exudate causes death in the rabbit in one-twelfth of the time which the same volume of the pure toxin solution requires. The question not unnaturally arises whether the toxin of this exudate be the same as that contained in the tumor extract. While the general clinical picture produced by the two substances is the same, the tremendously increased virulence of the exudate bespeaks either a very much greater concentration of the original toxin or the presence of a new, more powerful substance similar in its character to the first. While the solution of the tumor extract is saturated, the method of separation is designed to lower the solubility of the original substance, and in its original form there is no reason to suppose that it would not be materially more soluble. This phenomenon may also be explained by the theory that the equilibrium of the incitor constituents of the blood becomes unbalanced or, in other words, the immune antibodies are completely overwhelmed by the antagonists or inhibitors, due, no doubt, to the action of the toxic substance upon the nerve centers.

With the completion of the experiments just detailed, the necessity arose for certain control determinations defining the specificity of the tumor extract. On the one hand the bases used in the preparation of the material might be responsible for the toxic phenomena exhibited, and, on the other hand, the poisonous substance might result from the treatment of any tissue, normal or otherwise, by chemical reactions involved in the processes of separation. In order to resolve these points the following experiments were undertaken:

In the first case a salt was prepared from the base used (ZnO) in the separation and lactic acid, the latter selected as it is found in small amounts as constituent of normal tissue. Repeated injections of this material in quantities much larger than were used in the extract failed to produce other than most temporary and evanescent effects. Further repeated injections into the same animal have failed to produce the slightest evidence of disease even after many months' time and the administration of large quantities of substance. The wholly negative character of these careful and extended experiments warrants the conclusion that the mineral portion of the tumor extract as conditioned by the method of separation is wholly without influence in the production of the observed phenomena.

As the starting point for the second control experiment, tumors were selected which clinically and histologically gave absolute evidence of their benign character. These were treated in precisely the same manner as the malignant growths, and as a result of the various operations a crystalline product was obtained which differed materially in appearance from that derived from the carcinomata. Following the technique adopted with the earlier experiments, doses of this material were injected into both rabbits and guinea pigs. Neither with doses ten times that of the lethal dose of the carcinoma extract, nor with repeated injections over a long period of time, has it been possible to produce local or constitutional symptoms of intoxication, the effect of the injections being no more than would have been obtained with similar doses of normal saline solution. In short, neither the material used in the separation, nor the method itself, can produce the specific poison of the malignant tumor extract. Further, benign tumors contain no toxic substance or substances; none, at least, that are separable by the method employed.

The result of these experiments warrants the following conclusion: Carcinomata contain some substance or substances which are susceptible of isolation, and which, when injected into healthy tissue, produce results which are dependent upon the inherent chemical nature of the material itself.

The direct implication of this conclusion was the possibility of producing an antibody, the effects of which would directly antagonize the toxic action of the tumor substance. While the work of the past twenty years has made the subject of immunity a familiar one to the profession at large, a brief statement of the theory involved may not be out of place. As is well known, the injection of sub-lethal doses of the poisonous products of bacterial growth into healthy animals stimulates the formation of other chemical compounds antagonistic in action to the first. These antagonists, or antobodies, are found

in the blood plasma and remain in the serum of blood which has been allowed to coagulate spontaneously. Such serum when mixed with the original toxic substance in the proper proportions (for the action is presumably a chemical one) wholly nullifies the poisonous properties of the latter and renders the inoculation of animals with the resulting mixture entirely without pathological results to the animal. While the case is by no means as simple as might be implied by the following simile, the neutralizing action of the immune serum upon the poison can be regarded as analogous to the neutralization of an acid by an alkali, a specific amount of the one combining with and rendering inoperative a definite amount of the other. In the cases of poisons of relatively simple structure, up to the present time, at least, the usual procedure for the production of antagonistic antibodies has been unattended by success. On the other hand, not only the complex poisons produced by bacterial metabolism, but the similarly complex poisons of normal vegetable growth, such as abrin and ricin, have exhibited uniformly the power of stimulating the receiving organism to the production of the specific antagonizing compound. While up to the present nothing has been learned concerning the chemical nature of the active tumor extract, its capacity to produce antibodies could be studied experimentally to advantage. To that end a series of immunization experiments was undertaken, the details and results of which will be next considered.

For these experiments fifty-three healthy adult rabbits were selected. These were all injected in the same manner, under carefully maintained aseptic conditions, with 0.1 c. c. of the solution, corresponding to 4 milligrams of the active substance. The injections were made subcutaneously, the site being the abdomen. Transient dullness and slight malaise lasting for perhaps an hour or two were the only results of the injection. Ten days later a second immunizing dose was given, this time of 10 mg. of active substance. The same transitory and superficial dullness was the only manifestation. After a second interval of ten days the third injection was made, this time of 20 mg. It will be noticed that in non-immunized rabbits this dose would kill in twelve hours. In the present case the animals showed a more pronounced dullness than with the earlier and smaller doses, and in some few instances there were evidences of a general intoxication. Consequently the remaining three immunizing doses, which were given severally at ten-day intervals, were reduced to the 10 mg. of the second dose, which had been found to be perfectly tolerated. Thus, in a period of 50 days the animals received 64 mg. of the toxic substance divided into six doses. Of the 53 animals originally selected, five developed signs of malignant disease during the process of immunization, and though in these cases the injections were discontinued, the tumors continued to increase and in several cases terminated fatally. These were rabbits 5, 6, 7, 8 and 9, which have already been described. Ten more of the animals developed signs of constitutional disturbance of a greater or less severity. Autopsies showed unmistakable evidence of malignant growths; the remaining eight were apparently healthy; also the remainder of the series of 53, and these in most instances increased somewhat in size and weight during the immunizing period. Only these latter healthy animals were used in the subsequent experiments.

After several preliminary essays the following technique for securing the serum was adopted, and this was rigorously followed throughout in all the later work. The rabbit, to be bled, was taken and the chest over the region of the heart scrubbed thoroughly. The site thus prepared was ready for operation. With a sterile syringe the needle was plunged directly into the heart and 40 c. c. of blood withdrawn. This was done without apparent discomfort to the animal. In spite of the relatively large amount of blood removed in this way, the rabbits in every instance recovered from the operation, and in a brief period were completely restored to health and activity. The portion of blood was allowed to remain in the flask for 36 hours, the sterile conditions being carefully maintained, and then the clear, supernatant serum was decanted into small sterile bottles of amber glass which were closed with sterilized rubber stoppers. The yield of serum was about 50 per cent. of the blood taken.

The first experiment with the serum was performed as follows: Two guinea pigs of about the same weight were selected and into the first was injected 1 c. c. of the rabbit serum, while the control animal received a similar quantity of sterile salt solution. The experimental animal experienced a period of dullness after the injection, which lasted for perhaps three hours. This gradually passed away, however, and the animal was soon restored to apparently normal health and activity. Two days after the immunizing dose, 1 c. c. of the tumor extract was injected directly into the abdomen of each of the animals. The control guinea pig after exhibiting the characteristic symptoms, died in about 30 minutes. The immunized animal, on the other hand, showed not the slightest effect, either at the time of the injection or in the period of several weeks following. Obviously an immunity was conferred upon the latter animal.

The second experiment was undertaken to determine the strength of the serum obtained from the immunized rabbits, or in other words, the strength of the cancer antitoxin. For this experiment twelve healthy guinea pigs were chosen, each weighing 250 grams. Two were used as controls, not as before, but to prove that the 4 per cent. solution of the chemical product contained the same amount of toxin as used in previous experiments. Each guinea pig received intraperitoneally the lethal dose, 0.5 c. c. of the solution. The same clinical symptoms resulted, death following in the first guinea pig in 22 minutes, the second in 24 minutes. This proved conclusively the toxic action of the substance.

In the first experiment was determined the antitoxic action of the serum following injection directly into the guinea pig. Now the question arose as to the action of this serum upon the cancer product. The following procedure was carried out. The ten remaining guinea pigs received the neutralized product injected intraperitoneally. A series of two guinea pigs was used, each pair receiving the same dosage. To 99 parts of the same solution as was used in the first part of this experiment, 1 part of the antitoxic serum was added, well shaken, and 1 c. c. injected intraperitoneally into the guinea pigs.

No. 2—98 parts of solution and 2 parts of serum
No. 3—95 parts of solution and 5 parts of serum
No. 4—90 parts of solution and 10 parts of serum
No. 5—98 parts of solution and 2 parts of serum

No immediate fatal results followed. The animals were then placed in their cage and carefully watched. Later there was a slight constitutional disturbance. This was least noticeable in the animals receiving the 98 parts solution and 2 parts serum. Two of the above guinea pigs, the original No. 2 died. Post-mortem examination showed that the puncture was made too

(Continued on p. 20.)

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(*Continued from p. 70.*)

deeply, resulting in peritonitis. In No. 5, where care was taken to avoid this source of error, the results were most satisfactory and the animals remained in excellent health.

Similar experiments upon rabbits, using the same procedure as above, were carried out, special care being taken with the technique. The results were 100 per cent., as there was no death following. It may be noted that double the lethal dose was used in this part of the experiment.

Since the above results, which were during the early part of the experimental work, the technique has been developed so that at the present time we are able to obtain crystals in nearly a pure state.

The research work sicne 1913 has been principally to confirm the original work and perfect the technique. Some of the larger animals have been used in this work as well as the hen. It has been shown that this substance does have a specific action and hence must be in close association with the true etiological factor. If this be so, the study of immunity should solve the major problem.

With the knowledge gained by animal experimentation, immunity established and confirmed, the author felt he must know the action of this substance in the human body. First the antitoxin or immunized rabbit serum was used. While immunity was made possible in a large percentage of the cases, it was of the passive type. A small percentage of the cases showed symptoms resulting from injection of a foreign proteid or extraneous substance in the serum. The use of the antitoxin was discontinued and an attempt made to actively immunize with a solution of the carcinoma toxin, as was done in the rabbit. The question of dosage presented a problem of some magnitude, the substance being so active, and knowing the difference of individual susceptibility to drugs, extreme precaution was taken, but even then there were a few instances where its physiological action was demonstrated. Now being within the safe limit a large number of cases were undertaken, with the result that it has been definitely shown that the substance isolated from the active cell found in malignant growths of the carcinomatous type, does have a specific action, and when injected into the human body will produce immunity against this disease. I hope to be able in a short time to verify the above statement by blood examinations showing negative and positive reactions to carcinoma.

In conclusion, the facts elicited up to this point in the investigation may briefly be summarized:

1. A procedure has been developed whereby a substance or substances may be isolated from carcinomata, the method precluding the presence of organic life in the end product.
2. This end product has been shown to be of a highly toxic character.
3. The peritoneal exudate produced by a fatal intoxication is far more toxic than the original substance.
4. The tumor substance has been shown to possess not only a general, but also a specific toxicity, since on injection into rabbits in doses of less than lethal amount, it will produce well-defined, well-characterized carcinomata, the site of the primary lesion being different from and independent of that of the injection.
5. The appearance of the primary lesion is followed by the development of numerous metastatic foci in different parts of the body, while the characteristic cachexia manifests itself.
6. The poisonous tumor preparation has been shown to be characteristic of carcinomata.
7. By the repeated injection of very small doses a large number of rabbits have been immunized.
8. The serum from the animals thus immunized possesses the power of antagonizing the toxic action of the tumor substance. This has been demonstrated by injections of the serum either previous to or simultaneous with that of the tumor poison. In both events no effect is observed from quantities of the poison which, if injected alone, would produce a rapidly fatal intoxication.
9. With the simultaneous injection of poison and antibody it has been shown that one part of the latter will effectually antagonize 99 parts of the former.
10. That this substance does have a specific action when injected into the human body.

The Physician's Library

The Principles of Human Physiology. New (2nd) edition. By Ernest H. Starling, M. D., F. R. C. P., F. R. S., Jodrell Professor of Physiology in University College, London. Cloth, 1271 pages, with 566 illustrations, including 10 in colors. Lea & Febiger, New York and Philadelphia. $5.00 net. 1915.

In presenting a new edition of this book, which was favorably received in this department when the first edition appeared, the author has rewritten certain sections, especially those with the circulation and with voluntary muscles. He also discusses new subjects in the form of the nutrition of the brain and the innervation of the bronchi.

The clear and lucid style makes the reading of this somewhat prosaic subject of real interest, and it will give added interest to a closer study of this great and important fundamental subject.

Diseases of the Nervous System. By Smith Ely Jelliffe, Ph. D., Adjunct Professor of Diseases of the Mind and Nervous System, New York Post-Graduate Medical School and Hospital, and William A. White, M. D., Superintendent of the Government Hospital for the Insane, Washington, D. C.; Professor in Georgetown University, George Washington University, and the U. S. Army and U. S. Navy Medical Schools. Cloth, 796 pages, with 331 engravings and 11 plates. $6.00 net. Philadelphia and New York: Lea & Febiger, 1915.

The distinguished authors of this work have described the diseases of the nervous system in the order of its evolutionary development. The reader passes in orderly progression from the purely biophysical levels of unconscious automatic activities to the highest psychical levels of conscious social adjustment, which is the distinctive characteristic of man. The authors have produced a connected story embracing the whole realm of nervous diseases—not one book on neurology and another on psychiatry. Great advances have taken place in the knowledge of the two extremes of the nervous system, the vegetative and the psychical. The new facts gathered relative to the internal secretions and of their effects, acting through the medium of the vegetative nervous system, have given a comprehensive idea of the relationship between these two great groups of reactions so long considered under the unsatisfactory titles of the functional and organic. Therefore, in order to attain clearness and unity of treatment, the authors have expressed reactions either in physicochemical or

(*Continued on p. 22.*)

"The Ideal Tonic Reconstructive,"

says a well known physician, "is a malt extract that is sufficiently rich in diastase, maltose and other nutrient extractives to exert a marked influence on metabolic processes when taken into the body."

Many physicians have long realized this, but recent investigations emphasize as never before the almost specific utility of carbohydrates and diastase in a large proportion of nutritional disorders. As this fact has been established, the demand for a pure, high grade malt extract has extended, and in

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LISTERINE in teaspoonful doses will often afford relief in fermentative dyspepsia and is largely prescribed, with excellent results, in the various forms of diarrhoea occurring in infants and adults.

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(*Continued from p.* 20.)

in psychological terms, as seemed best. It is hardly too much to say that this book is certain to make a deep impression on the medical profession.

How to Live. By Irving Fisher, Ph. D., Professor of Political Economy, Yale University, and Eugene Lyman Fisk, M.D., Director of Hygiene of the Life Extension Institute, with a forword by William Howard Taft. Cloth, 345 pages, illustrated, $1.00 net; by mail, $1.12. New York: Funk & Wagnalls Company, 1915.

This is a book based on personal hygiene and shows one how to live in order to get the most out of life. It preaches conservatism of energy, the housing of one's physical resources to the end that one may live long, happily and without the diseases which harass middle and old age. The book is essentially uplifting and helpful.

The Criminal Imbecile. By Henry H. Goddard, Director of the Department of Research, Vineland Training School. Cloth, 157 pages. New York: The Macmillan Co., 1915.

The value of this book will be instantly apparent to those who have to do with criminality. It considers the case of three persons indicted for murder. The progress made of late in criminology was responsible for the recognition of these persons as "criminal imbeciles" and their cases were accordingly disposed of in a manner creditable to our newer knowledge of criminal jurisprudence. If books like this continue to be produced our courts will soon be in a position to recognize the necessity of impartial medical testimony and cases in which the defendants are mentally weak will be treated accordingly.

Sex Problems in Worry and Work. By William Lee Howard, M.D., author of "Facts for the Married," etc. Cloth, 204 pages. New York: Edward J. Clode, 1915.

Dr. Howard believes that in many directions we can well afford to aid nature and not "let it have its own way." With logical reasoning he proves his case, at least as far as sex problems are concerned. He thinks that our starting point is wrong, that our viewpoint is narrow, that we are hampered by tradition, ignorance and false prudery. He shows how we can enter upon the ascent that leads to contentment and peace by following normal lines. His is a message to Garcia and he who heeds will profit.

The Clinics of John B. Murphy. Vol. IV, No. 4, 1915. Paper, $8 per year. Philadelphia and London: W. B. Saunders Co., 1915.

This number, unusually well illustrated, contains clinics on a wide variety of cases and each subject is handled in Murphy's usual masterly manner. He is known in Europe as America's greatest surgeon and these clinics have been the partial means of giving him this reputation. A feature of each clinic is a brief summary which serves as an introduction.

Lectures on the Heart. By Thomas Lewis, M. D., Lecturer in Cardiac Pathology, University College Hospital, London. Cloth, 124 pages, $2.00 net. New York: Paul B. Hoeber, 1915.

This book includes the Herter lectures, given in Baltimore by Dr. Lewis last fall, a fourth before the Harvey Society in New York and the fifth at McGill University. They have been published in the medical press, but Mr. Hoeber does well to place them together in book form. They are the thoughtful presentation of a great authority upon a great subject and are a real contribution to medicine.

Renal Decapsulation in Some Forms of Bright's Disease.

Surgeons have recently made certain advances in the treatment of some forms of Bright's disease, which are reviewed by Professor Rovsing in *Hospitals-tidende,* Nos. 2 and 3, 1915. Professor Rovsing classifies Bright's disease into septic and aseptic nephritis. The septic nephritis is most often due to the bacillus coli, and is best treated by internal antiseptics, such as salol and urotropin, washed down by large quantities of distilled water, and vaccines. Even in the most severe cases, with miliary abscesses scattered throughout the kidney, with great œdema of the renal substance and with violent hemorrhages, medicinal treatment is more effective than any operation. But in the aseptic nephritis, in which class Professor Rovsing includes the large white kidney, the small granular kidney, and other intermediate forms, operative treatment is often strikingly beneficial. Nephrolysis or decapsulation, in which the capsule of the kidney is divided, adhesions are freed, and the fatty capsule is removed as far as possible when it shows fibrotic changes, has been practised by Professor Rovsing for many years. Altogether he has operated on 46 patients, 9 of whom were operated on before 1901, and 37 between 1901 and 1913. In every case in which there was any doubt as to the nature of the disease the diagnosis was confirmed by a microscopic examination of a small portion of the kidney. One patient was an officer, aged 37, who suffered from parenchymatous nephritis. He was much debilitated by attacks of hematuria and severe albuminuria. Catheterization of the ureters showed the kidneys to be equally affected, but as the patient's career called for heroic measures bilateral decapsulation was performed. The albuminuria disappeared eight days later, and during the following observation period of nearly three years neither albuminuria nor hematuria was observed. The officer no longer looked pale and flabby and was able to perform the most arduous duties. This is only one of the many striking cases which Professor Rovsing reports in full. He claims that decapsulation is capable of curing completely the various forms of aseptic nephritis associated with hematuria, albuminuria, and pain. He insists on the necessity for the early differential diagnosis of septic and aseptic nephritis, and he urges physicians to familiarize themselves with the technique of catheterization of the ureters, so that the urine drawn from the two kidneys may be examined separately.—(*The Lancet,* Sept. 4, 1915.)

X-ray therapy is indicated in all cases of myomata in which surgical measures are contraindicated owing to the presence of some general or local condition, such as advanced nephritis, chronic bronchitis, exophthalmic goitre, diabetes, enlarged thyroid and arterio-sclerosis.

The *x*-ray is contraindicated in any form of degeneration, innocent or malignant. Fibroids causing pressure symptoms, unless very trivial in nature, should be dealt with surgically, and so, too, should those complicated with disease of the uterine appendages, inflammatory or cystic.

"A cold" is due to coagulation of fibrin in the blood current caused by injury of the leukocytes circulating through the vessels of the cooled-off portions of the body.

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NEW BRUNSWICK, N. J.

The Annual Report of Surgeon General Blue, of the Public Health Service.

The annual report of Surgeon General Blue of the Public Health Service records the largest amount of work performed in the history of that organization.

Perhaps the most important achievement of the year was the discovery that pellagra is a deprivation disease, resulting from a faulty diet containing an excess of carbo-hydrates. While the final experiments which led to this discovery have only recently been completed, the conclusion itself is the culmination of investigations extending over a period of seven years. The work has consisted of epidemiological field studies, actual feeding experiments conducted at numerous places in Georgia and Mississippi, and experimental research at Spartanburg, S. C., and other places.

A great reduction in immigration has been observed during the year, with a corresponding increase in the number of aliens certified. At the Port of New York, the percentage has risen from 2.29, previous to the development of the European conflict, to 5.37 since that time; this increase largely being due to the fact that with the decreased immigration more time can be devoted to the examination.

On the occurrence of plague at New Orleans, the state and local health authorities requested the Public Health Service to take charge of the situation. Extensive rat-proofing and other anti-plague measures were undertaken, resulting in the eradication of the disease from human beings, and the practical extermination of the rodent infection.

Great reduction in the incidence of malaria was obtained in localities where surveys were conducted. Drainage projects, rice culture studies and the conditions surrounding the impounding of water for power purposes were investigated in order to eradicate as far as possible the disease in these areas. Scientific investigations of malarial infection showed that in the latitude of this country the most important agent in carrying the infection through the winter season is man, and not the infected, hibernating, Anopheles mosquitoes as was previously supposed. From the standpoint of prevention this is a discovery of considerable value.

Studies of occupational diseases and industrial hygiene were instituted at several places during the year. A survey of the industries of Cincinnati was made to determine the cause of the prevalence of tuberculosis among industrial workers. The investigations relating to the migration of persons suffering from tuberculosis were completed.

Upon the request of the health authorities of five states, the organization and operations of the respective boards of health were studied and recommendations advanced for improvement in the powers and duties of these bodies.

Trachoma was combated in the Appalachian Mountains, where it is most prevalent, over 12,000 cases being treated.

Rural sanitation work was conducted in six different states and everywhere resulted in the reduction of typhoid and other communicable diseases.

Public health laboratories for the prevention of the interstate spread of disease were established at Chicago, Seattle and numerous other railway centres.

Additional duties have been imposed upon the service by extension of relief benefits to the newly organized Coast Guard and the physical examination of seamen applying for the rating of "able seamen."

Mulford's New Department.

The H. K. Mulford Company announces the establishment of a department of Sanitation and Epidemiology, under the executive management of Thomas W. Jackson, M. D., expert in preventive medicine, sanitation and the study and control of epidemic diseases.

The most important subjects before the American people at the present time relate to the public health. Work in this field is frequently beyond the reach of the existing health and sanitary departments of the various municipalities and smaller towns, on account of limited appropriations.

The department does not propose to enter into competition with the constituted public health authorities, Local, State or Federal, but to aid and assist these authorities in every possible way. The work is essentially one of service and education, and will be developed along these lines. The resources and equipment of the Mulford Laboratories, Chemical and Bacteriological, will be utilized, thus placing at the disposal of the New Department the entire laboratory facilities and expert services of the H. K. Mulford Company.

It takes brains to make a smart man, but good luck often makes a famous one.—GEORGE F. BUTLER.

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This is not a drug method. Drug methods often leave the patient's nervous system shattered and his condition so wretched that he is very liable soon to drift back into the old habit.

There are no tricks of hypnotism or "suggestion" in the Battle Creek Method. The rational and physiologic means employed not only remove the craving for the drug, but deliver the patient from the pain or neurasthenic miseries to relieve which the drug was first used, and if faithfully employed finally reinstate the patient by removing the morbid effects resulting from the use of the drug.

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The Campaign Against Cancer in Missouri.

The most recent addition to the many agencies, now engaged in the warfare on cancer is the Department of Preventive Medicine of the University of Missouri. This department has just published in the University *Bulletin* a special article on the early diagnosis and treatment of cancer by Dr. F. A. Martin. The purpose of this bulletin is to call the attention of its readers to the campaign for the education of the laity which is being carried on by the American Society for the Control of Cancer, the American Medical Association and other national and state organizations, and to give a brief general survey of the cancer problem as a phase of preventive medicine.

The knowledge and skill of surgeons in the treatment of cancer has progressed, according to the *Bulletin,* almost to the limits of what is possible and if the percentage of cures by this, the only method of treatment which offers reliable hope of cure, is to be increased, the patients themselves must co-operate by seeking earlier diagnosis and treatment. On examining the histories of a large number of cases it has been found that the patients whom the surgeon failed to cure were those who came to him late in the disease when the cancer had spread to such an extent that to remove all the cancer cells would have required an operation so great that in itself it would be sufficient to cause the death of the patient. On the other hand it is found of another group of cases which sought treatment soon after the cancer was noticed that 100% were cured. To increase the percentage of cases treated early the *Bulletin* urges that laymen learn the meaning of cancer and its first warnings in order that they may go to the surgeon in time when the cancer is still in the early stages and the chance for cure is high.

Among the many facts already known about cancer, perhaps the most important is that the disease nearly always begins in some form of abnormal tissue. This abnormal tissue which is often easily recognized, may have existed for only a few months or it may have been present from early childhood without causing trouble, only to change into cancer in later life. To these bits of abnormal tissue or groups of cells, has been given the name of "precancerous lesion." The *Bulletin* says that not all such conditions develop into true cancers, but most of them should be kept under careful observation by a competent medical adviser and removed as soon as there is real danger of malignant disease. This is the only known method of preventing, as distinguished from curing, cancer and the article describes carefully the various forms of precancerous lesions which should be regarded with suspicion. Among these are pigmented moles, cracks on the lip, blisters, scabs and similar persisting abnormal conditions of the skin. Probably only a very small proportion of these conditions become cancer but when moles, for instance, are so located that they are subject to constant irritation and when in later life they change in color and appearance and begin to grow it is time to have them properly attended to. Moles and warts should never be treated with caustic but the whole lesion together with its so-called roots should be removed. When a burn on the tongue or lip from smoking does not heal within a few months it is a source of danger. Generally speaking, the removal of precancerous lesions is a trivial operation requiring only local anestheia.

After the true cancer has developed it is still possible to cure a large percentage of cases if the surgeon is given a fair chance while the disease is still local. All cases of cancer are local in the beginning and may remains so for a few weeks to several months. It is during this period that surgical treatment offers the possibility of practically 100% of cures. Unfortunately for the patient pain is so rare at this stage of the disease and the conditions seem so trivial that in a great number of cases the opportunity to be saved is forfeited by the delay. In cancer of the breast, for instance, the cases cured by the late operation amount to about 30%, but by an early operation, at least 80% are saved. If every woman who is not nursing would go to a surgeon within 24 hours after she finds a lump in her breast, 90% of the cases of cancer of the breast would be permanently cured.

Cancer of the tongue is perhaps the most malignant and cures by the late operation are few in number. If a small ulcer appears on the tongue consult a surgeon at once. When such an ulcer is produced by a ragged tooth, consult a dentist first and then if the ulcer does not heal within a short time after the cause has been removed it is a surgeon's task.

In almost all the common forms cancer is connected with some kind of irritation. Gall stones, for instance, should be removed since it is established that from four to fourteen per cent. of all cases are followed by cancer.

Cancer of the uterus gives early warning by a discharge of an unusual character at an unusual period and of unusual duration. The removal of the uterus is not a dangerous operation and if the disease is recognized at an early stage the life of the patient can be saved.

The *Bulletin* issues an emphatic warning against quacks and their bogus testimonials, pointing out that their method of deception lies mainly in the diagnosis. There are so many conditions closely resembling cancer that the average layman cannot distinguish among them, and it is behind such conditions which are not cancer and which would tend to heal without treatment that the "cancer specialists" take their stand and make their false claims.

Five Steps in the Development of X-Ray Apparatus.

1. The Rhumkorff Coil, with which Prof. Roentgen performed his original experiments, was used for a number of years as the standard type of *x*-ray apparatus for want of something better to excite the tube. This was soon discarded, however, owing to the annoyance caused by the hammer vibrator or interrupter.

2. The Static Machine was the next step in the progress of *x*-ray apparatus, and for many years was considered the most available means of exciting the tube. The demand for a more powerful apparatus finally brought about the adoption of

3. The Induction Coil with mercury or electrolytic interrupter. With this apparatus bone structure of any part of the body could be easily radiographed, but soft tissue work could not be accomplished owing to the relatively long exposures required of several seconds duration.

4. The Transformer with Rotary High Tension Rectifier has placed Roentgenology upon a more scientific and practical basis, affording much greater penetration, shorter exposures and much greater definition in pictures. This arrangement has been considered ideal from the standpoint of results, and manufacturers in general had come to the conclusion that the very highest plane of development possible in the construction of apparatus had been attained and that there was no room for further improvement.

5. The Hogan Silent *X*-Ray Transformer, Interrupterless, Motorless, Commutatorless and Noiseless, marks a distinctive era in the construction of *x*-ray apparatus, as it affords all of the power of the ordinary interrupterless transformer and at the same time greater simplicity of construction and operation. In this apparatus all moving parts have been eliminated with the exception of the spark gap adjustments. This makes it possible to place upon the apparatus a five-year guarantee against break-down, as there is practically nothing to wear out. Full particulars regarding this apparatus may be had by addressing the manufacturers, the McIntosh Battery & Optical Co., 322 West Washington Street, Chicago, Ill.

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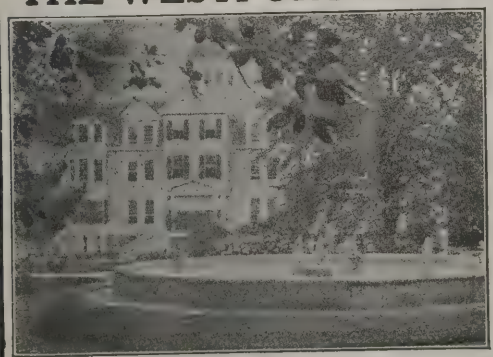

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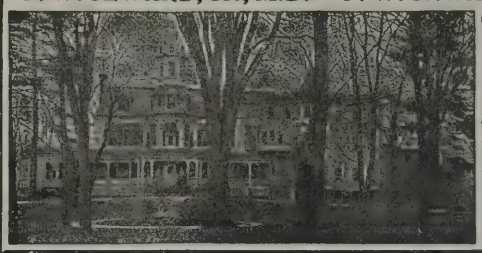

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Co-operation between the medical profession and the drafters of health insurance legislation promises to be a feature of the growing campaign for health insurance. Already the American Medical Association has appointed a committee consisting of Dr. Alexander Lambert, of New York, chairman; Dr. Henry B. Favill, of Chicago, and Dr. Frederick Cotton of Boston, to co-operate with the American Association for Labor Legislation. This organization after three years of study has drafted a bill for State health insurance which will be introduced into the legislatures of 1916. The committee is charged with the duty of putting the finishing touches to the bill, and especially to those provisions which affect the profession. Doubtless the co-operation of these two parties will make it possible to avoid a repetition of the British struggle and will do much to provide effectively for medical care.

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La Grippe—Acute Coryza.

———————, M.D., Ill.

What is the best method of aborting grippe or acute nasal catarrh? My observation prompts me to believe that sedation is more effective than stimulation. A vascular sedative, as digitalis or aconite, does good. Calomel followed by a saline is very efficient at the beginning, Glyco-Thymoline in a 25 to 50 per cent. solution with water used with the K. & O. Nasal Douche allays the congested mucous membrane of the nose and throat. It is alkaline, antiseptic and sedative, and always makes the patient feel more comfortable. When a more sedative action is desired I often put a little menthol with the solution.

The persistent distress caused by the congestion and accumulated secretions within the nasal passages in influenza is a familiar clinical picture. Of all the local treatment that I have used I am firmly convinced that Glyco-Thymoline has been of the greatest use and I am accustomed in all such cases to use it as a routine procedure.

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Case I.—W. T., age 12, schoolboy. Presented a most violent coryza, making breathing through the nose impossible, his condition subsequently developing into influenza. The mucous membrane from the anterior nares to the pharynx was congested and there was also a marked acute catarrhal conjunctivitis. Although his temperature was 103°, with severe prostration and cough, the chief symptom he complained of was pain and discomfort produced by the ineffectual efforts on his part to expel the secretion from the nose. Glyco-Thymoline was used, which resulted in abatement of the symptoms with great comfort to the patient.

Case II.—S. K., age 14, schoolboy. Contracted influenza. He had hypertrophied turbinates which greatly added to the distress caused by coryza. The discharge from the nose was profuse and caused excoriations of the lips and contiguous skin. In this case but little of the solution was injected anteriorly, as the hypertrophy and congestion prevented it from entering posteriorly, but the anterior nares were frequently packed with gauze strips, half-inch wide, saturated with a 50 per cent. solution of Glyco-Thymoline and allowing same to remain five minutes (with great relief to the patient).

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The Journal of Laboratory and Clinical Medicine has made its appearance, with this editorial staff: Editor-in-chief—Victor C. Vaughan of Ann Arbor. Associate Editors—Pharmacology, Dennis E. Jackson of St. Louis; Bacteriology, Hans Zinsser of New York; Immunology and Serology, Frederick P. Gay of San Francisco; Physiological Pathology, Paul G. Woolley of Cincinnati; Physiological Chemistry and Clinical Physiology, J. J. R. MacLeod of Cleveland and Roy G. Pearce of Chicago; Clinical Microscopy and Laboratory Technique, Roger S. Morris of Cincinnati.

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Psychological Analysis of Stuttering.

Walter B. Swift, of Boston, says his psychoanalysis reveals stuttering as some vague trouble in the personality. Psychological analysis shows stuttering is an absent or weak visualization at the time of speech. This new concept of stuttering may be called visual centre asthenia. The lack or weakness in visualization accounts for all the numerous phenomena of stuttering in severe, medium, or mild cases.—(*Jour. Abnorm. Psych.* Oct.-Nov., 1915.)

Observations of the Voice in Tabes—A Voice Sign.

Walter B. Swift, of Boston, relates a case of tabes with lesion located mostly in the bulb, showing a marked speech defect of inco-ordinate articulation important enough to interfere with business, was treated by a series of vocal co-ordinating exercises and relieved.—(*Amer. Jour. Insanity,* Oct., 1915.)

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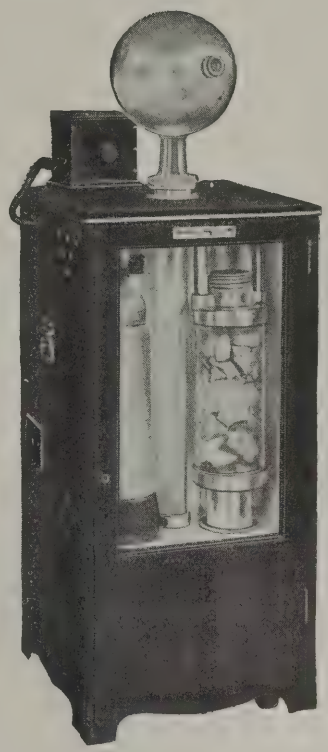

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Public Health Report of the Secretary of the Treasury.

The annual report of the Secretary of the Treasury as it relates to the Public Health Service contains numerous recommendations bearing on the functions of that organization and evidences the great interest of this department in the extension and expansion of the governmental agencies for the protection of the public health.

In the development of general public health work, according to the Secretary, there is great need of additional medical officers. The number of requests for advice and assistance in health problems received from states and municipalities during the past year has far exceeded that in any similar period in the history of the Service, but the limited number of officers available for the work has prevented in many instances compliance with these requests.

The field investigations, the Secretary states, have served as a stimulus to state and local health agencies, and every effort should therefore be made to encourage and turn to practical account the interest in health matters awakened in the general public. For this reason an increase in the appropriation for field work is requested.

An additional building for the Hygienic Laboratory is urgently neded. The work of this institution has been greatly extended, particularly as it relates to the examination of viruses, serums and analogous products, a vast market for which has recently been created abroad. The safeguarding of these therapeutic agents requires great accuracy and precision and overcrowding is a serious handicap. In order that the public health may be better protected, an annual appropriation of $25,000 is recommended to be expended in carrying out the provisions of the law relating to the examination of these products.

The United States is the only government of importance which does not provide for the care and isolation of lepers. The establishment of a national leprosarium where the numerous lepers, most of whom are native born Americans, may be properly segregated and treated, thereby eliminating a menace to the health of others is urged.

The further recommendations of the Secretary relate to the need of additional clerical assistance in order to meet the demands which are increasingly made on the Public Health Bureau.

"Can the Speech Present a Sign of Congenital Syphilis?"

Walter B. Swift, of Boston, believes congenital syphilis can cause a faulty or incomplete development of vocal cords that results in vocal monotony and harshness in both conversation and weeping. As spirochaetosis has been of late offered to cover all the lesions of syphilis, he proposes as a name for this sign scaphoid vocal cords and spirochaetotic harshness.—(*Boston Med. & Surg. Jour.* Oct. 21, 1915.)

Coryza—Acute Nasal Catarrh.

This condition is manifested by a local congestion of the nasal mucous membrane, with an infiltration of serum into the tissues and later an exudation on the part of the mucous membrane.

The local treatment calls for a remedy capable of relieving the engorgement by exosmosis, which can never be achieved by the use of acid or astringent preparations.

The use of Glyco-Thymoline in these cases purges the mucous membrane, relieving the congestion, and then by stimulating the local capillary circulation to renewed activity prevents a re-engorgement.

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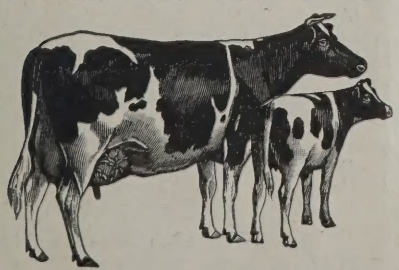

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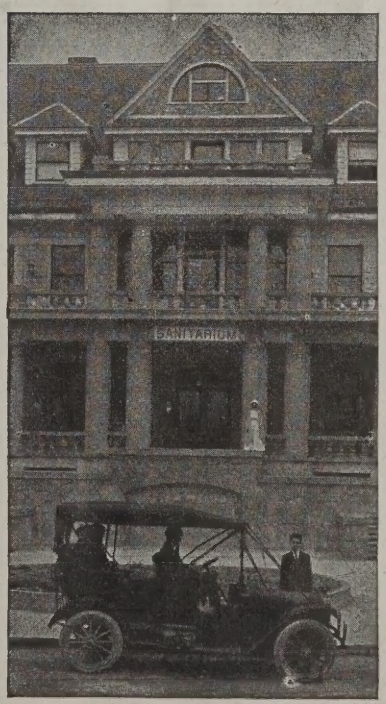

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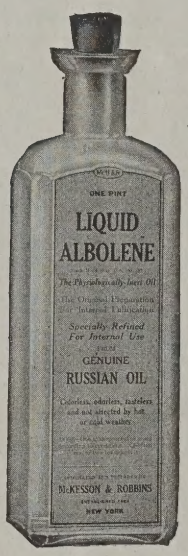

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